

INDUSTRIAL DEVELOPMENT OPPORTUNITIES FEASIBILITY ANALYSIS FOR TARGET SECTORS

Prepared by:

Property Counselors and Real Estate Economics Inc.

I. INTRODUCTION

A. PURPOSE OF STUDY AND STUDY PROCESS

1. BACKGROUND AND PURPOSE

The State of Washington and Port of Benton have authorized a feasibility study to evaluate development opportunities for land and facilities transferred from the Hanford Reservation. The study is examining whether State and Port investments in the site are warranted. The potential for transportation, industrial and other economic development opportunities are being evaluated to determine if statewide transportation and economic needs will be met. The study is a joint effort of the Legislative Transportation Committee, Washington State Department of Transportation, Washington State Department of Transportation, Washington Department of Community, Trade and Economic Development, and Port of Benton.

It was prompted by the Port of Benton's successful bid to obtain 768 acres of administrative, supply and maintenance facilities transferred from the Department of Energy to local public ownership. Included in the transfer were 16 miles of a 124-mile federal rail system crossing the reservation, which could have strategic transportation implications for the entire state. The remaining 108 miles of federal rail is being considered for future transfer action along with industrial development lands and facilities from the southeast corner of the Reservation. The feasibility study was commissioned to address any questions of public interest and support as substantial investment, risks and rewards are expected in bringing these development opportunities to reality over the next 20 or more years.

2. STUDY PROCESS

The work is being undertaken in four phases:

1. **Phase I – Preliminary Feasibility.** This initial phase will identify property assets and candidate opportunities, define feasibility criteria and initially screen, rate, and rank opportunities to determine which options and/or initiatives will be studied in detail in Phase II.

2. **Phase II – Detailed Feasibility.** This phase will evaluate economic development opportunities that were identified in Phase I. The focus will be on the market viability of specific, or groups of industries and businesses.
3. **Phase III – Coordinated Program Feasibility.** Industries, economic development and transportation initiatives found to be feasible in Phase II will be coordinated, and evaluated as a total program in this phase.
4. **Phase IV – Master Planning.** This phase will utilize the development, infrastructure and financial information produced in Phases I through III for preparing a conceptual level Master Plan to guide the nature and timing of the program.

The opportunities evaluated for feasibility in Phases I and II fall into two broad categories: industrial development opportunities and transportation initiatives. While the two categories are interrelated and are ultimately coordinated in Phases III and IV, they are evaluated in a parallel fashion in Phases I and II.

The Phase II report addresses each category of opportunities. This section of the report documents the results of the analysis of industrial development opportunities.

B. RESULTS OF PHASE I

The Phase I industrial analysis evaluated over 100 individual business ideas and identified eight categories of industry which are promising for further evaluation in Phase II. These eight categories are:

1. Energy and Energy Systems
2. Environmental Technology and Services
3. Advanced Materials
4. Information/Communication
5. Warehouse/Distribution
6. Miscellaneous Manufacturing
7. Transportation Equipment Manufacturing
8. Low Compatibility Uses

These uses were determined to be promising candidates for the Hanford lands in that the area met basic suitability requirements, the uses were preferable in terms of their economic impacts, and the area might enjoy some competitive advantages over other potential locations.

C. PHASE II PURPOSE AND APPROACH

In general terms, the purpose of the Phase II analysis is to evaluate the feasibility of the target industry categories in more detail. More specifically, the Phase II tasks include the following:

1. Refine industry category definitions and identify current businesses in those categories.
2. Interview representatives of businesses in those categories, both in the local area and elsewhere in the United States.
3. Describe industrial siting and building requirements in each category.
4. Prepare projections of employment growth in each category based on market outlook and study area competitive position.
5. Prepare projections of acreage and facility requirements by representative building types.
6. Estimate public investment requirements by facility type.
7. Re-evaluate feasibility of selected target opportunities.

The results of these tasks are documented in this report.

D. ORGANIZATION OF REPORT

This report is organized in 3 sections.

- I. Introduction
- II. Analysis and Projections
- III. Feasibility Summary for Industrial Categories

Appendices

Section II presents the analysis of several key factors affecting potential demand, as well as underlying employment, land, and investment requirements. Section III applies these results in the evaluation of each of the industrial categories.

II. ANALYSIS AND PROJECTIONS

Feasibility of development within each of the eight target categories is based on an analysis of overall demand and the Hanford Study Area's competitive position. This section provides the analysis of several key competitive factors, and presents projections of potential industrial development and requirements. The section is organized in five subsections:

1. Existing Economic Base and Workforce Factors
2. Real Estate Market Conditions
3. Projections of Future Employment
4. Projected Land and Facility Requirements
5. Public Investment Requirements

A. EXISTING ECONOMIC BASE AND WORKFORCE FACTORS

A review of the existing economic base of the Tri-Cities area provides a starting point for assessing future growth as well as an understanding of factors such as labor force availability and wage rates.

1. EMPLOYMENT BY SECTOR

The Tri-Cities economy has historically had only a modest manufacturing base. Table II-1 summarizes current and projected employment in Benton and Franklin Counties. As shown, manufacturing employment in 1998 represents only 8.2 percent of non-farm employment. By 2008 that share is projected to drop to 7.8 percent.

Table II-1
Benton Franklin Counties
Annual Average Non Farm Wage and Salary Employment
1998, 2003, and 2008 Projections

	1998	2003	2008	Percent 1998-2003	Change 2003-2008
Manufacturing					
Food & Kindred Products	3,500	3,600	3,800	2.9%	5.6%
Printing & Publishing	500	500	500	0.0	0.0
Chemicals & Allied Products	800	800	700	0.0	-12.5
Primary & Fabricated Metal Products	400	400	500	0.0	25.0
Other Manufacturing	700	900	900	28.6	0.0
Subtotal	5,900	6,200	6,400	5.1%	3.2%
Nonmanufacturing					
Construction	4,200	4,400	4,500	4.8	2.3
Transportation & Public Utilities	2,900	3,200	3,500	10.3	9.4
Wholesale & Retail Trade	16,300	17,200	18,100	5.5	5.2
Finance, Insurance & Real Estate	2,300	2,400	2,500	4.3	4.2
Services & Mining	26,800	29,100	30,400	8.6	4.5
Business Services	2,500	2,700	2,700	8.0	0.0
Research Services	12,400	12,800	12,800	3.2	0.0
Government	13,900	15,300	16,400	10.1%	7.2%
Subtotal	66,400	71,600	75,400	7.8%	5.3%
Total Non Farm Employment	72,300	77,800	81,800	7.6%	5.1%

Source: Washington State Employment Security, Annual Demographic Information 1998, Service Delivery Area XI

Somewhat lost in the projections is the impact of Hanford employment. Included within research services, Hanford employment has experienced significant declines in recent years. Employment at the Department of Energy and its contractors was approximately 18,000 in 1994 and dropped to 9,900 by 1998. As the cleanup mission at Hanford is completed over coming years, Hanford employment will experience further significant declines. The economic challenge for the area in general, and a major impetus for this study, is to create private basic jobs to offset the loss of Hanford employment.

2. UNEMPLOYMENT

The rate of unemployment in a community is a measure of both its health and the availability of its workforce to capture new economic opportunities. As shown in Table II-2, Benton and Franklin counties have the second highest unemployment rate of metropolitan areas in the State of Washington. The area has a need to create new jobs, but also a workforce resource to attract them.

Table II-2
Civilian Labor Force
Unemployment Rates by County

	1997		1999 (Proj.)	
	Unemployed	Rate	Unemployed	Rate
Benton Franklin	6,800	7.3%	8,200	8.7%
King County	32,900	3.3	36,500	3.5
Snohomish County	10,900	3.5	12,500	3.8
Pierce County	14,800	4.5	17,700	5.2
Clark County	6,100	3.6	8,380	4.7
Yakima County	11,500	10.0	14,100	11.9
Spokane County	9,500	4.6	11,600	5.6

Source: Washington State Employment Security, Annual Demographic Information 1998, Service Delivery Area XI

Table II-3 summarizes the make-up of the unemployed workforce by occupational category. The largest category is structural work, including construction and fabrication. In addition to agriculture, there is a large pool of unemployed workers in the categories of professional, technical, and managerial workers.

Table II-3

**Benton Franklin Counties
Unemployment Insurance Claimants by Occupational Category**

	Benton County	Franklin County	Total
Professional, Technical, Management	1,520	288	1,808
Clerical	920	293	1,213
Sales	365	125	476
Service	688	329	1,017
Agriculture, Forestry, and Fishing	941	1,392	2,333
Processing	562	797	1,359
Market Trades	374	123	497
Bench Work	89	27	116
Structural Work	2,119	610	2,729
Motor Freight and Transport	400	245	645
Packaging and Materials Handling	452	294	746
Misc. Occupations	76	19	95
Total	8,506	4,542	13,048

Source: Washington State Employment Security, Annual Demographic Information 1998, Service Delivery Area XI

3. WAGE RATES

Benton County had average wage rates approximately equal to the State as a whole in 1997, but well below those in the Puget Sound area.

Washington State	\$30,756
Benton County	30,914
Franklin County	21,518
King County	37,299
Snohomish County	32,243
Pierce County	26,442

More importantly, the area has wages in individual occupation categories which are significantly below those in the Puget Sound area. Table II-4 compares Tri-Cities area wages for 1998 with those for King County.

Table II-4
Benton Franklin Counties
Wage Rate Comparison

Occupational Code		Benton Franklin	King	BF as %
Managerial & Administrative				
13014	Administrative Services Mgr.	\$20.60	\$24.50	84%
19005	General Mgr. & Top Exec.	23.10	31.12	74
Professional & Technical				
21114	Accounts & Auditors	16.92	19.75	86%
24308	Biological Scientist	18.56	25.17	74
24105	Chemists	17.54	20.58	85
27121	Civil Engineer	23.98	25.99	92
25105	Computer Programmer	19.80	24.04	82
22128	Industrial Engineer	27.00	21.20	127
28108	Lawyer	31.36	34.83	90
21511	Personnel/Labor Relations	17.27	18.24	95
25102	Systems Analyst	21.09	25.44	83
Administrative Support				
55338	Bookkeeping/Accounting	10.40	12.96	80%
56017	Data Entry	10.38	9.74	107
55307	Typist/Word Processor	10.44	12.17	86
55305	Receptionist & Info Clerk	7.14	9.74	73
Service Occupations				
67005	Janitor	8.55	9.53	90%
Production, Construction & Operation				
93956	Assemblers & Fabricators	9.67	10.58	91%
87102	Carpenters	18.17	18.48	98
87202	Electricians	20.02	20.53	98
85110	Machinery Mechanic	12.79	17.67	72
89108	Machinist	17.42	17.91	99
97956	Operating Engineer	19.23	21.30	90
89132	Sheet Metal Worker	16.51	16.76	99
87814	Structural Metal Worker	18.42	19.04	97
97102	Truck Driver – Heavy	14.65	16.83	87
93914	Welders & Cutters	10.80	14.75	73

Source: Washington State Employment Security, Annual Demographic Information 1998 Service Delivery Area XI

As shown, with the exception of the industrial engineer and data entry positions, local wages are below those for King County, representing from 73 percent to 98 percent of the average King County wage for comparable categories. The differential is smallest for certain union trades, and greatest for lower skilled positions. The differentials for the construction trades will likely increase as relatively high wage Hanford jobs are eliminated over time.

B. REAL ESTATE MARKET CONDITIONS

1. INDUSTRIAL LAND SUPPLY

The Tri-Cities area offers a large number of industrial sites for prospective companies. Although no local comprehensive inventory of industrial land exists, rough estimates suggest approximately 9,000 acres (in varying states of development) are currently available.

The primary focus of this analysis is on industrial development opportunities during the next 20 years on both existing serviced land in north Richland and on Hanford study area land. DOE has already transferred 1,596 acres of Hanford land to public ownership in the north Richland area, as follows:

Port of Benton

Technology and Business Campus (250 acres)

Richland Industrial Center—3000 Area (71 acres)

Horn Rapids Rail Center—1100 Area (760 acres)

City of Richland

Horn Rapids Industrial Park (515 acres)

The specific geographic focus of this Phase II report is industrial development opportunities during the 2000-2020 period on the above Port of Benton lands and on mostly adjacent vacant industrial land north of Horn Rapids Road.

An estimated 878 net acres of vacant land are presently available in the above three Port of Benton industrial areas. Ground improvements are in varied states of development. For example, the Technology and Business Campus is substantially improved with roads and utilities. In contrast, roadways need to be constructed as land in the Horn Rapids Rail Center absorbs.

Industrial and business park land prices in north Richland vary substantially from \$2,500 to \$28,000 per acre (service to the lot line). This large variance is attributable to a range of development types from manufacturing facilities at the low end to multi-story office at the high end; but is also attributable to the absence of a market driven demand for industrial land. The Port of Benton and the City of Richland are aggressively seeking new businesses and accompanying jobs for the community. In doing so, they typically offer prospective firms very low land prices in order to attract them. Such low prices are driven by the aforementioned excess supply of industrial land in the Tri-Cities region and the push by economic development entities to replace the shrinking number of Hanford jobs. Recently, much discussion has occurred between public and private officials concerning attracting new local jobs by offering industrial land to businesses at below market rates—the current situation.

While there is a significant amount of land available for development, there are few vacant facilities for rent, other than older Hanford facilities designed for specialized uses.

2. INDUSTRIAL AND OFFICE RENTS

Typical Tri-Cities market rents for industrial and office buildings are illustrated in Table II-5. Annual lease rates are shown for six building types by respective components of rent. For example, the base rental rate for office space will run about \$10.00 per square foot per year plus expenses of \$5.00 to \$5.50 per square foot. (Expenses for a full service office lease include insurance, maintenance, janitorial, utilities, property taxes and asset management.) In contrast, annual base rents in high tech/flex buildings and multi-tenant buildings range from \$8.00 to \$12.00 per square foot and modified expenses (NN) are approximately \$2.00 per square foot. (Landlord pays only part of the building expenses, such as outside maintenance and snow removal.) Basic R & D building base rents are somewhat lower but typically accrue expenses in line with or above straight office buildings. In contrast, the annual base rent for basic warehouse or large manufacturing space (shell space) in the Tri-Cities is typically about \$3.50 per square foot plus \$2.00 for expenses.

Tenant improvement costs can vary widely. They typically run in the \$25.00 to \$35.00 per square foot range for new office, high tech/flex and multi-tenant buildings. Tenant improvements for R&D buildings with extensive laboratory build-outs (such as at the Pacific Northwest National Laboratory) can be very expensive. Such tenant improvement costs can fall in the \$120.00 - \$300.00 per square foot range (or even more). Landlords typically try to amortize tenant improvement costs over the term of the lease through the base rental rate.

C. PROJECTIONS OF FUTURE EMPLOYMENT

Projected demand within each of the targeted industrial categories for the Hanford Study Area is measured by employment. Employment is a useful measure for two reasons: it is a common measure of economic growth and diversification, and underlying data is available in sufficient detail to distinguish the identified categories and subcategories.

The eight target categories were identified in the Phase I report and include:

1. Energy and Energy Systems
2. Environmental
3. Advanced Materials
4. Information/Communications
5. Wholesale Distribution

Table II-5

**TYPICAL MARKET RATES BY BUILDING TYPE
RICHLAND, WASHINGTON**

BUILDING TYPES	Annual Lease Rates Per S.F.				Tenant Improvements Per S. F.
	Base Rate	Shell	Expenses	Full Service	
Office	\$10.00		\$5.00-\$5.50	\$15.00	\$30.00-\$35.00
High Tech/Flex-Use*	\$10.00-\$12.00		\$ 2.00	\$12.00-\$14.00	\$25.00-\$30.00
Multi-Tenant Buildings*	\$8.00-\$10.00		\$ 2.00	\$10.00-\$12.00	\$30.00-\$35.00
Research & Development	\$8.00		\$5.50	\$13.50	\$120.00 - \$300.00
Large Manufacturing**		\$ 3.50	\$ 2.00	\$5.50	
Divisible Warehouse/Distribution**		\$ 3.50	\$ 2.00	\$5.50	

*Modified "NN" rate where landlord pays some expenses , including exterior maintenance.

**Any small office buildout component is at multi-tenant office space rates.

6. Miscellaneous Manufacturing
7. Transportation Equipment
8. Low Compatibility Uses

The methods, assumptions and results of the employment projections in the eight categories are described below.

1. METHODS AND ASSUMPTIONS

Projections are made at the subcategory level for each of the eight categories. The subcategories are each defined in terms of 4 digit SIC codes. The definitions are shown in the appendix to this report. Current employment at the State level and Tri-Cities level are aggregated from 4 digit SIC data from *US Census Bureau County Business Patterns* to determine baseline employment by subcategory. The base year for the projections is 1997.

Future employment by category and subcategory at the State level are projected at five year intervals through 2020. Assumed growth rates are taken from Washington Department of Employment Security and Office of Financial Management *1998 Long Term Economic and Labor Forecast Trends for Washington*, at the 2 digit-level and adjusted based on information derived from business interviews and industry reports.

The Hanford Study Area employment levels are projected as an assumed share of State employment. The assumed shares are determined by considering the current Tri-Cities share, and the competitive position of the Hanford Study Area. The results are evaluated for reasonableness given the projected increase and the implied number of new businesses.

The Hanford Study Area is defined as the 29,000 acres owned by the Department of Energy and the Port of Benton. As a practical matter, the assumed employment increases could occur in the adjacent City of Richland Horn Rapids Industrial Park as well.

Specific growth rate assumptions and study area share assumptions are included the appendix to this report. The assumptions are discussed further in the feasibility summary for each category in Section III.

2. RESULTS

The employment projections are presented at the subcategory level in the appendix, but summarized by category in the following tables. As shown in Table II-6, statewide employment in the eight categories is projected to grow from 223,000 in 1997 to 363,000 in 2020, an annual average growth rate of 2.2 percent. The fastest growing category is Information/communications.

Projected employment in the Hanford Study Area is summarized in Table II-7 and Figure II-1. As shown, employment in all categories is projected to grow by 9,700 jobs between 1997 and 2020, an average annual growth rate of 6 percent. The largest sectors in terms of absolute growth are Environmental and Information/communications.

D. PROJECTED LAND AND FACILITY REQUIREMENTS

The businesses within the eight target industrial categories have physical requirements which are common across categories. For purposes of projecting land, facility and infrastructure needs, it's more useful to organize the analysis by building type then industry category. This section presents the projections for facility requirements and is organized in two subsections.

Description of Building Types

Projected Requirements

1. DESCRIPTION OF BUILDING TYPES

There are six basic building types which accommodate the types of businesses within the target industry categories.

Divisible Warehouse/Distribution are large buildings with high ceilings and open areas to provide for the storage and distribution of goods.

Large Manufacturing Buildings are also large buildings with high ceilings and open areas to accommodate production and assembly of goods. The buildings often have special characteristics such as a heavy floor loads, and equipment such as overhead cranes.

Multi-Tenant Buildings are often called incubator buildings and accommodates several small industrial firms.

High Tech/Flex Buildings are typically one or two story buildings with some office/lab space left open bay areas to provide flexibility in use.

Research and Development are multistory buildings with higher floor to floor heights and floor loads and extensive heating, ventilating and air conditioning systems to accommodate lab and testing space.

Office Buildings are often multitenant buildings with finished office space.

Pictures of typical buildings in each category are shown in Appendix 2 to this report. The characteristics of the six building types are compared in Table II-8.

Table II-6
Projected Employment by Industrial Category
State of Washington
Summary by Category

	1997	2005	2010	2015	2020	Ann. Growth
Energy/Energy Systems	18,400	20,900	22,000	23,100	24,100	1.2%
Environmental	36,300	45,000	49,300	53,600	57,700	2.1%
Advanced Materials	15,000	17,500	19,200	20,700	22,300	1.8%
Information/Communications	61,100	90,200	104,600	119,500	134,500	3.7%
Wholesale/Distribution	61,300	67,700	71,600	76,400	81,200	1.3%
Miscellaneous Manufacturing	16,700	20,400	22,300	24,200	26,000	2.0%
Transportation Equipment Mfg.	12,300	13,400	14,000	14,700	15,300	1.0%
Low Compatibility Uses	1,600	1,700	1,800	1,900	1,900	0.8%
TOTAL-ALL CATEGORIES	222,700	276,800	304,700	334,000	363,000	2.2%
EMPLOYMENT CHANGE:						
Interval		54,100	27,900	29,300	29,000	
Cumulative from 1997		54,100	82,000	111,300	140,300	

Table II-7
Projected Employment by Industrial Category
Hanford Study Area
Summary by Category

	1997	2005	2010	2015	2020	Ann. Growth
Energy/Energy Systems	1,400	1,600	1,700	1,800	2,000	1.6%
Environmental	1,700	2,700	3,500	4,400	5,300	5.3%
Advanced Materials	-	200	300	500	800	
Information/Communications	500	1,300	1,900	2,600	3,500	9.2%
Wholesale/Distribution	-	300	300	300	300	
Miscellaneous Manufacturing	-	200	400	700	1,000	
Transportation Equipment Mfg.	-	100	200	300	300	
Low Compatibility Uses	-	100	100	100	100	
TOTAL-ALL CATEGORIES	3,700	6,500	8,500	10,800	13,400	6.0%
EMPLOYMENT CHANGE:						
Interval		2,800	2,000	2,300	2,600	
Cumulative from 1997		2,800	4,800	7,100	9,700	

Figure II-1

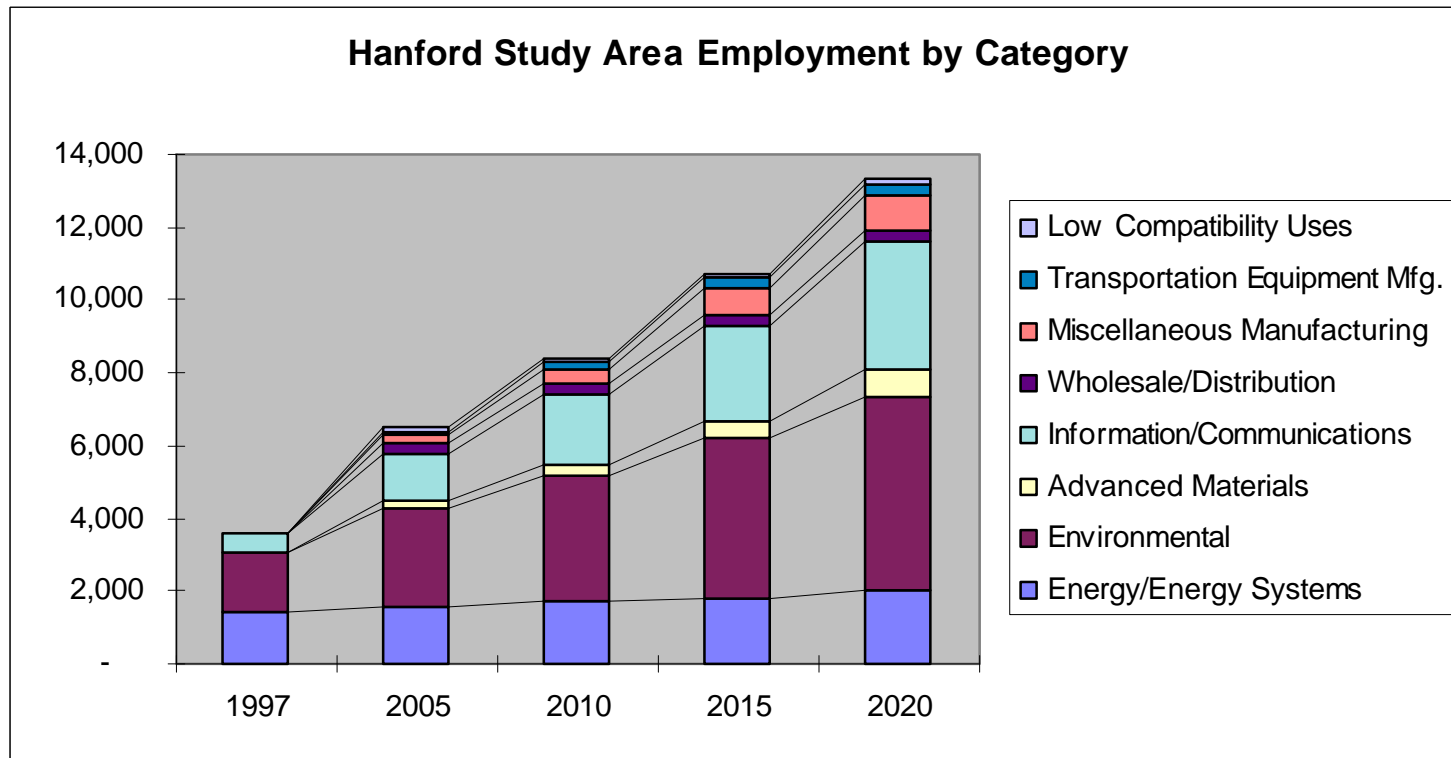


Table II-8

MARKET DETERMINED SITING REQUIREMENTS BY BUILDING TYPE HANFORD INVESTMENT STUDY

BUILDING TYPES	Typical Site Area (acres)	Employees per Acres	Building/Land Coverage Ratio	Parking Ratio (Stalls/1000 s.f.)	Electricity Requirements	Process Water Requirement	Wastewater Treatment	Maneuvering	Door Level
Divisible Warehouse/Distribution	100 to 200	4	10%	1 to 2	800A, 277V, 3-Phase	None	None	120 Feet	Dock High
Large Manufacturing	20 to 50	11	15%	2 to 3	1-2,000A/Tenant	Up to 100,000 gpd	Pretreatment	120	Dock High
Multi-Tenant Buildings	3 to 5	15	20%	2.5 to 4	2-300 A/Tenant	None	None	120	Dock High
High Tech/Flex-Use	3 to 5	15	20%	3 to 4	3-400A/Tenant	Nominal	Pretreatment	80 Feet	Grade Level
Research & Development	3 to 5	27	20%	4 to 5	3-400A/Tenant	Nominal	Pretreatment	80	Grade Level
Office	3 to 5	54	40%	5	3-400A/Tenant	None	None	80	Grade Level
Low Compatibility	200 to 500	1	1%						

The allocation of employment by category to building types is shown in Table II-9. The allocations shown are derived from our professional judgement. Generally, the sectors which are predominantly manufacturing in nature will occur in manufacturing buildings, while the uses which are research and service based, will occur in office and research and development space.

Note that a seventh category is shown for the low compatibility uses, which have specialized requirements.

2. PROJECTED NEEDS

The employment projections by category are translated into projections by building type by applying the allocations factors from Table II-9. The employment projections are translated into land and facility requirements through application of utilization factors as shown in Table II-10. These utilization factor include square feet of building area per employee, ground coverage (building square feet divided by land square feet), and the resultant employees per acre. The factors are derived from studies of industrial usage in the Puget Sound area with adjustments for the local area. Tri-Cities ground coverage ratios are lower because land is used less intensively in smaller metropolitan and rural areas. Note that office uses have high employment densities: approximately 70 employees per acre, as compared to warehousing and low compatibility uses with 3.6 and 0.3 employees per acre respectively.

Projections of net acreage requirements are shown in Table II-11 and Figure II-2. Total required acreage for the target industrial categories is projected to grow from 220 to 1,370 by 2020. Of the 1,150 net acre change over the period, 510 acres are in the low compatibility use category. Other major facility types are large manufacturing and high tech/flex space with changes of 270 and 130 net acres respectively.

Net acreage figures represent the acreage within finished industrial parcels. Gross acreage needs are generally 30 – 40 percent higher in order to accommodate roads, critical areas, landscaping, and buffers.

The gross acreage requirement can be further adjusted by a “market factor” to reflect the fact that efficient real estate markets must have additional land available in order to assure a matching of specific user needs with available sites, as well as to provide a range of alternative choices. Combining a market factor as well as a gross to net conversion, yields an overall factor of approximately 2 to 1 as a ratio of total required acreage and net acreage needs.

Table II-9

HANFORD INVESTMENT STUDY

Allocation by Building Type

	Energy	Environmental	Materials	Information	Distribution	Misc. Mfg.	Transportation	Low Compatib.
Divisible Warehouse/Distribution					95%			
Large Manufacturing	20%	20%	75%	20%		70%	80%	
Multi-Tenant Building	20%	20%	5%	10%		10%	10%	
High-Tech/Flex	20%	20%	10%	30%		5%	5%	
Office	10%	10%	5%	30%	5%	10%		
Low Compatibility								100%
Total	100%	100%	100%	100%	5%	100%	100%	100%

Source: Real Estate Economics Inc.
Property Counselors

Table II-10

HANFORD INVESTMENT STUDY

Utilization Factors by Building Type

	Sq. Ft. per Empl.	Grnd. Coverage	Empl. per Acre
Divisible Warehouse/Distribution	1,200	10%	3.6
Large Manufacturing	600	15%	10.9
Multi-Tenant Building	325	20%	26.8
High-Tech/Flex	600	20%	14.5
Office	250	40%	69.7
Low Compatibility	1,500	1%	0.3

Source: Real Estate Economics Inc.
Property Counselors

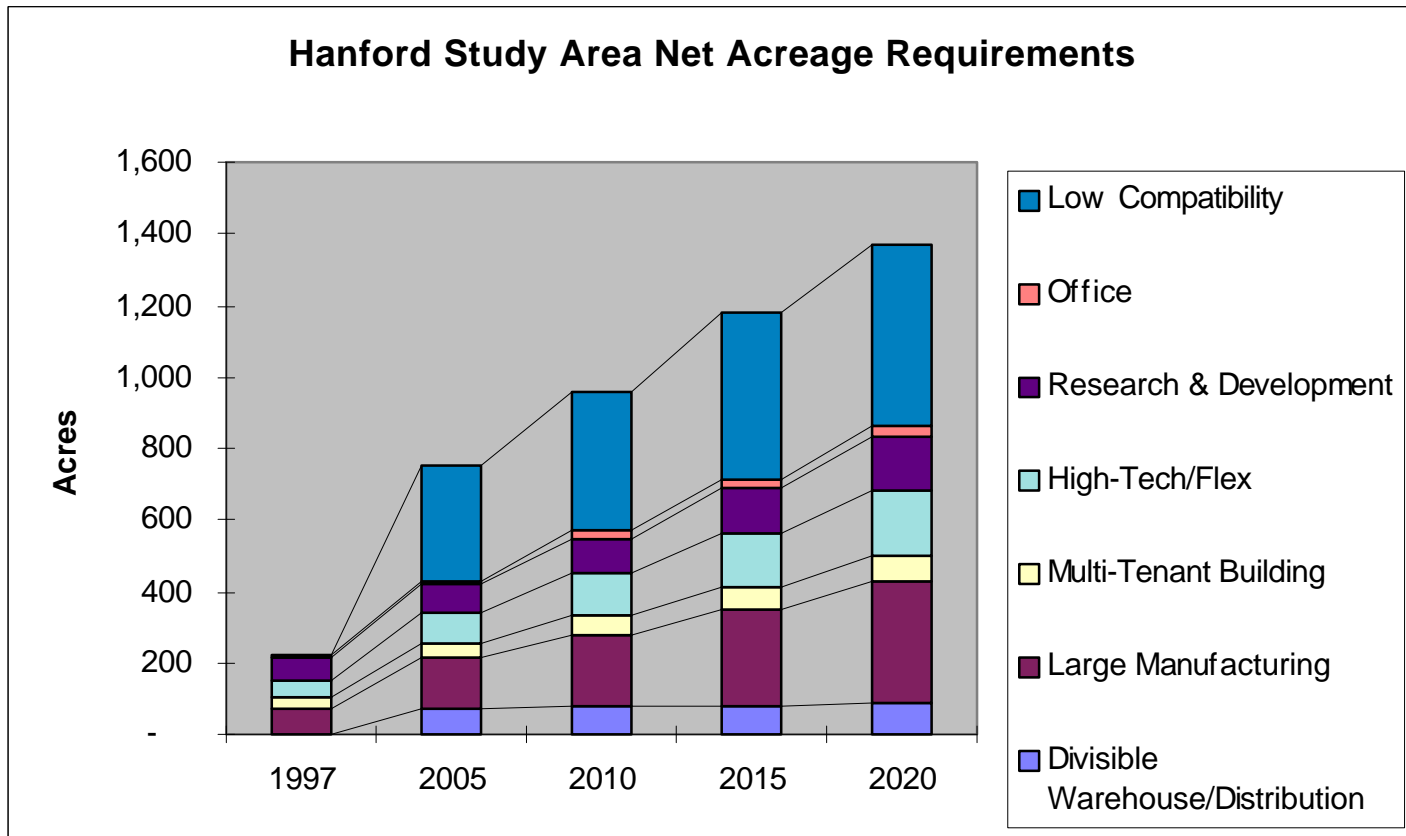
Table II-11

**HANFORD INVESTMENT STUDY
REQUIRED NET ACREAGE BY FACILITY TYPE**

Summary

	1997	2005	2010	2015	2020
Divisible Warehouse/Distribution	-	70	80	80	90
Large Manufacturing	70	140	200	270	340
Multi-Tenant Building	30	40	50	60	70
High-Tech/Flex	50	90	120	150	180
Research & Development	60	80	100	130	150
Office	10	10	20	20	30
Low Compatibility	-	320	390	470	510
Total	220	750	960	1,180	1,370

Figure II-2



E. PUBLIC INVESTMENT

Development of the acres required to accommodate projected industrial demand will require a combination of public and private investment. This section provides an estimate of the cost of developing industrial sites, and a specification of the portion of that cost which would be public investment. The sector is organized as follows:

Areas Considered for Development

Infrastructure Items Considered

Estimated Cost and Investment

1. AREAS CONSIDERED

The 1,150 net acres identified as the 20+ year land requirement could be accommodated in several existing areas (developed or undeveloped) within the study area. The net requirement was identified as:

Low Compatibility	510 Net acres
Other Categories	640 Net acres
Total	<u>1,150 Net acres</u>

The low compatibility uses would be accommodated on isolated sites somewhere within the study area.

The other categories could be accommodated within the existing developed Richland Industrial Center and Technology and Business Center, the relatively undeveloped Horn Rapids Rail Center, and a potential new area north of Horn Rapids Road.

Applying the factor for net to gross conversion and a market factor, the total industrial land requirement for the categories other than low compatibility would be approximately 1,300 acres. The existing industrial areas could accommodate 878 of those acres.

Technology and Business Center	175 Gross acres
Richland Industrial Center	43 Gross acres
Horn Rapids Rail Center	660 Gross acres
Total	<u>878 Gross acres</u>

Thus approximately 420 gross acres would be required in a new industrial area. For purposes of this analysis, that new area is assumed to be a one mile square site immediately north of the Horn Rapids Rail Center. The areas considered for development are shown in Figure II-3 on the following page.

Figure II-3: Development Areas

2. INFRASTRUCTURE ITEMS CONSIDERED

Local roads and utility services are well developed within the Richland Industrial Center and within the Technology and Business Campus. Local roads and utility services are nonexistent within the North Area and essentially nonexistent within the remaining developable portions of the Horn Rapids Rail Center. A highway (Route 4) runs along the eastern side of the North Area but municipal utility services are not available north of Horn Rapids Road. Rail lines bisect the Horn Rapids Rail Center and run along the eastern side of the North Area. There are no rail lines within or adjacent to the Richland Industrial Center or the Technology and Business Campus.

It is assumed that all six of the industrial business concepts would require local road access to each potential business site, along with a full range of utility services, including fiber optic cable. Costs to develop local roads and utility laterals within the Horn Rapids Rail Center and within the North Area are included in each business estimate. These costs are greater per site for the North Area as it is necessary to extend utilities north along Route 4 to roughly the midpoint of this area. These costs to develop local roads and utility laterals are significant. They are estimated on the assumption that a one square mile tract will be fully developed into 128 sites of 4 acres each, 16 sites of 35 acres each, or 4 sites of 150 acres each. The total costs per site therefore reflect the spreading of these costs over as many as 128 sites. Figure II-4 shows the prototype layout plan for the North Area used as a basis for estimating costs.

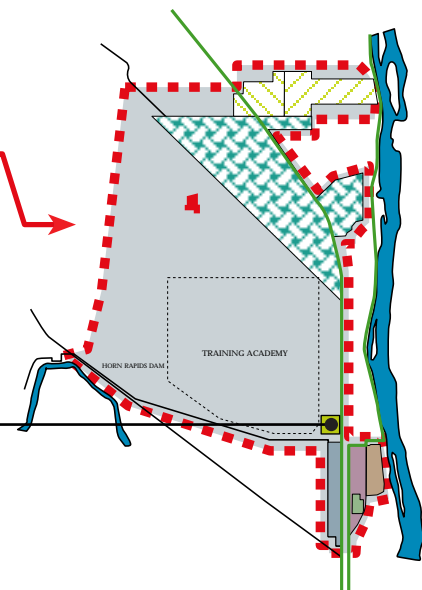
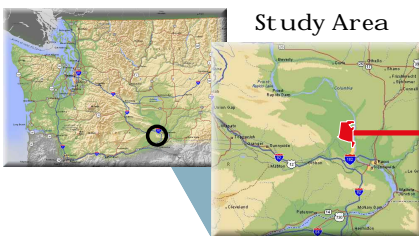
Costs to extend utility services, from local roads and utility laterals to the nearest edge of offices or warehouses, are estimated to be common within each of the four areas and are included as probable developer costs. Costs to develop rail service are included in the estimates for the heavy industrial business concepts within the North Area and the Horn Rapids Rail Center. Rail service was not estimated and is assumed to be unnecessary or inappropriate for the Technology and Business Campus.

Since rail access is available to both the Horn Rapids Rail Center and along the eastern side of the North area, the cost to extend rail service into each will be equal. Rail costs are included in the estimates for both the warehouse and large manufacturing uses. Costs are estimated for extending the rail from the existing line to the furthest edge of each site. Cost items include clearing, grading, track and turnouts.

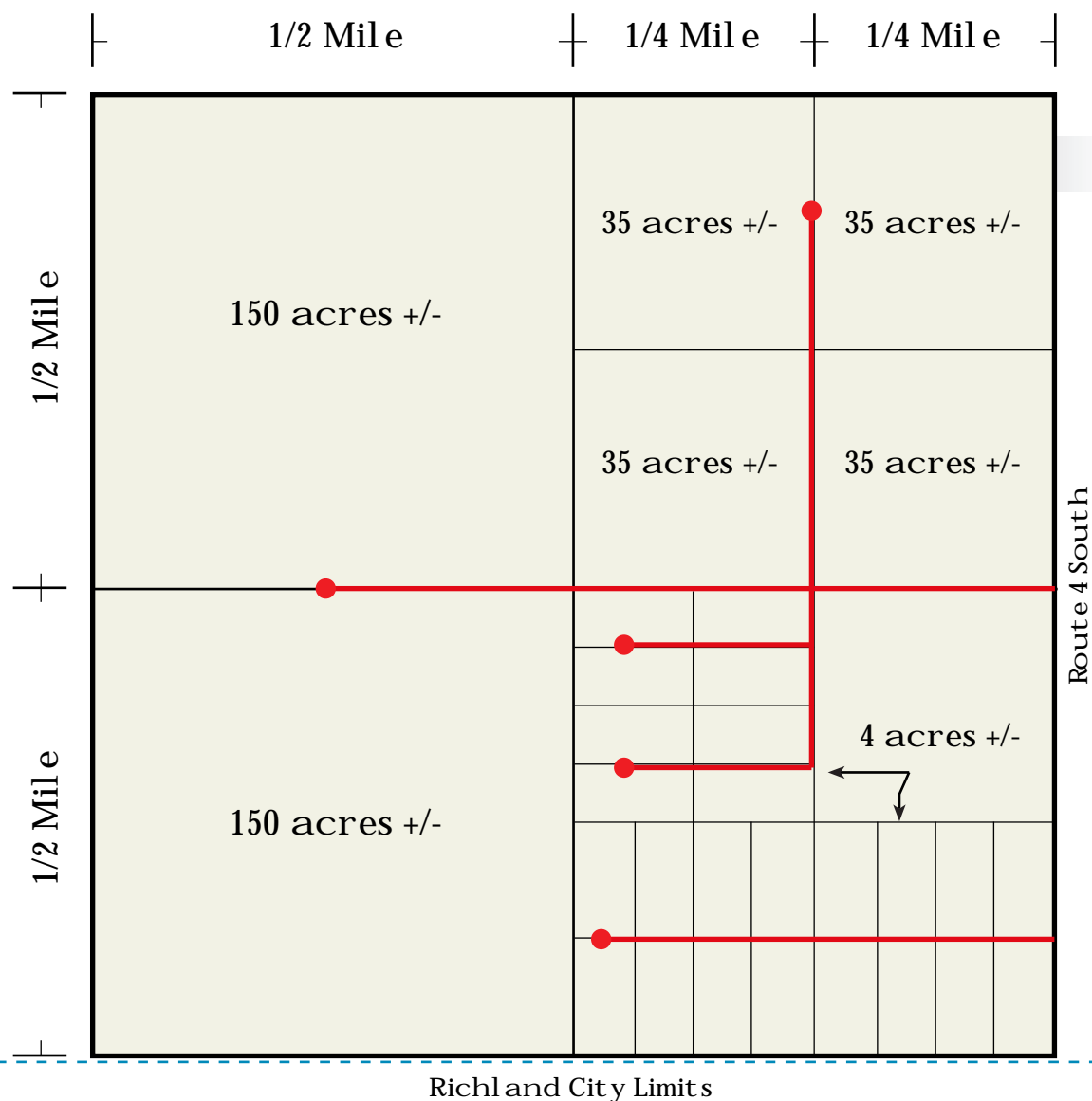
3. ESTIMATED COST AND INVESTMENT

Infrastructure and site development cost are estimated for each building type based on typical parcel sizes and infrastructure needs. The complete cost estimate and basis for quantity estimates is presented in an appendix to the report.

Site Development Potential



Prototypical Section of Property



LEGEND:

New: Road
Electrical
Water
Sewer
Stormwater
Fiber Optic

=

The costs are categorized as follows:

- On-site development costs are the costs of grading and utility extensions from the lot line to the building.
- Infrastructure extensions – along public rights of way and into undeveloped areas are estimated separately for the Horn Rapids Rail Center and the proposed new area.

The public investment is identified as:

- 10 percent of on-site developer cost reflecting a small public investment as incentive to developers or users. It is consistent with current practice by Richland and the Port of Benton to fund some on-site infrastructure.
- The entire cost of extending spine roads and utilities up to and into the undeveloped areas. This public investment will allow these areas to be brought into economic service.

The resultant projected cost for both the developer paid on-site share and the public investment is summarized in Table II-13. Costs are expressed in constant 1998 dollars and include hard construction cost plus a 40 percent factor for fees and administration.

As shown, developer on-site costs at any of the sites would vary from \$5,900/acre for a warehouse facility to \$51,700 for an office building. The public investment is relatively small at the Technology and Business Campus and Richland Industrial Center (where the public investment is limited to the assumed 10 percent share of developer on-site cost). It is much higher at the Horn Rapids Rail Center and North Area where the investment includes the cost of extending utilities, and in the case of warehouse and large manufacturing, the cost of accessing rail.

These investment estimates can be used in two ways:

- To determine an overall financing program in Phase III, and
- To evaluate the investment feasibility of individual industrial categories.

With respect to the latter, the public investment costs can be compared to the prevailing land values in the area. For example, the \$34,100/acre public investment in the North Area for office development exceeds the prevailing land value of \$28,000 per acre for such uses.

The cost of infrastructure, assumed to be borne by the public, could not be transferred to an owner developer without owner incurring costs (including existing basis in the land) exceeding the land's value.

Table II-13

Development Cost and Public Investment per Acre

	Dvlpr On-site	Public-TBC&RIC	Public-HR Rail	Public-North Area
Divisible Warehouse/Distribution	5,900	700	10,200	11,400
Large Manufacturing	10,400	1,200	29,900	31,100
Multi-Tenant Building	46,600	5,200	32,100	33,500
High-Tech/Flex	50,400	5,600	32,600	34,000
Research & Development	50,400	5,600	32,600	34,000
Office	51,700	5,700	32,700	34,100

TBC: Technology and Business Center

RIC: Richland Industrial Center

HR Rail: Horn Rapids Rail Center

III. FEASIBILITY SUMMARY OF INDUSTRIAL CATEGORIES

A. CATEGORY 1: ENERGY/ENERGY SYSTEMS

The energy/energy systems category includes R & D production, distribution and a variety of services related to existing and emerging energy sources. Specific subcategories have been identified as:

- Energy R&D /Testing
- Laboratory Instruments
- Electric & Other Energy Sources

An established base of Tri-Cities companies and energy organizations represent this category. They include:

- Energy Northwest
- Uniwest Corp.
- Set-point Control Inc.
- Stavely Instruments
- CWT Technologies

1. MARKET ASSESSMENT

A. OUTLOOK

The national market for energy products and services is large and projected to grow moderately. Significant Tri-Cities competencies are concentrated in the energy/energy systems industry, including potential niche markets. This is a particularly pertinent since the energy industry is in flux due to growing competition, new energy production technologies and increasing environmental concerns about greenhouse effects. The local Hanford workforce offers unique technological skills and thereby a comparative advantage as the energy industry restructures.

The “renewable energy” and “energy efficiency” industries are increasingly positioned to employ technologies that rely less on fossil fuels. Sources of energy that do not rely on fossil fuels for power generation include solar, wind, geothermal and biofuels such as ethanol or methane. Such sources characterize the renewable energy sector. Firms engaged in the research, design, sale, installation and operation of facilities that utilize these energy sources generally could fit well into the Tri-Cities economy given the high concentrations of scientific and engineering talent.

Similarly, certain types of private energy efficiency businesses could very well be viable in the Tri-Cities by capitalizing on existing intellectual resources and research facilities. Although more difficult to define than the renewable energy industry, the energy efficiency industry includes consultants, energy controls, energy-related engineering firms, and other energy efficiency businesses. For example, Benton County contains about 2.8 percent of the non-agricultural employment in Washington State, yet accounts for 8.0 percent of the state's natural scientists (including 34 percent of physicists and 5.4 percent of engineers). The challenge is to now link this heavy concentration of Hanford-related engineering and scientific talent with real local job and enterprise creation.

Several structural trends in the fossil fuel electricity industry also suggest timing may be appropriate for the creation of new energy businesses in the Tri-Cities. The wholesale market for electricity has now moved toward competition. In the fossil fuel energy industry, bigger is no longer cheaper. Technological changes and the use of highly efficient natural gas turbines make small-scale generation projects feasible, removing traditional barriers to entry. Although these industry trends present near-term challenges for firms in the renewable energy industry, the long-term prospects are positive for energy efficiency and renewable energy.

B. EMPLOYMENT PROJECTIONS

The State of Washington Department of Employment Security projects that within the Energy/Energy Systems industry category, statewide employment growth in energy R&D and testing will be the fastest growth segment. Statewide employment in this segment is forecast to increase by nearly 3,500 during the next 20 years. In contrast, employment in the Electric And Other Energy Sources industry segment is expected to grow relatively slowly. Overall, employment growth in the Energy/Energy Systems target industry category will by approximately 5,500 jobs statewide by 2020.

The Hanford Study Area, particularly close-in portions, is well positioned to capture an increased share of this statewide employment growth. The high concentration of scientific and engineering talent associated with the Hanford contractors and the Pacific Northwest National Laboratory needs to be effectively marketed in the Energy/Energy Services industry. It is projected that the Hanford Study Area could capture about the same 10 percent share of the electric and other energy sources employment statewide by 2020 as exists today. However, the local energy R & D testing sector is forecast to capture 5.0 percent of state employment by 2020—over three times the share captured today. Similarly, Hanford Study Area employment in energy-related laboratory instruments is projected to capture 6.0 percent of statewide employment during the next 20 years. This is double the current local capture rate.

Total Hanford Study Area employment in the energy/energy systems industrial category is forecast to grow by nearly 600 employees during the next 20 years. It will then total almost 2,000 jobs. Although most of these jobs are expected to be concentrated in the electric and other energy sources area, the fastest growing industry segments are projected to be in the energy R&D testing and laboratory instruments areas.

C. COMPETITIVE FACTORS

An assessment of key competitive factors for the energy/energy systems industry was conducted relative to competitiveness of the Hanford Study Area. This was achieved through a review of the literature and interviews with persons considered knowledgeable in the industry. The following factors were uncovered as key to the competitiveness of the area:

1. The local availability of technology workers with specialized skill sets is crucial. Included are software engineers and R & D scientists.
2. A major criteria for locating a plant is to develop an entrepreneurial culture of innovation and business information exchange.
3. Excellent communications infrastructure and fiber optics are critical. Dual feed power systems and generator backup are also very important.
4. Most of the energy R&D and laboratory instruments products are high value and low bulk. Good air express service and trucking is very important in shipping many of these types of goods. Rail is generally not required.
5. Good air service into the community was often mentioned as particularly important so that executives can quickly access major urban centers in the eastern U.S. and on the west coast.

2. PHYSICAL REQUIREMENTS

A. LAND AND FACILITY REQUIREMENTS

Firms in the energy/energy systems industry typically occupy large manufacturing buildings and R & D and high-tech/flex type buildings. Energy research typically takes place in R & D and high tech/flex buildings on sites three acres or less. Building sizes typically range from 15,000 to 40,000 square feet.

In contrast, buildings for the manufacturing of energy machinery and parts may demand sites of five acres and above. Often manufacturing operations purchase extra land to ensure that future plant expansions can be easily accommodated.

The total project net acreage requirement in the Hanford Study Area for the energy/energy system industry is projected to be 35 acres. Given the concentration of local scientific talent currently associated with Hanford, the predominate building types needed will be R&D and high tech/flex buildings.

A typical example of facility requirements is Itron in Spokane. Currently, Itron employs between 350- 400 people in about 200,000 square feet of building space. This equates to about 500 square feet per employee.

B. INFRASTRUCTURE NEEDS

The energy/energy systems industrial category requires excellent communications infrastructure. Industry business typically use many T-1 lines. A local fiber optics loop and connections already exists in north Richland. GTE is expected to have a fiber optics cable running to the Tri-Cities area in the very near future. This is an extremely important infrastructure component necessary for instant connections throughout the world.

As noted, most products manufactured in the energy/energy systems area will be shipped by truck. Good air express service was often mentioned as particularly important for quickly shipping low bulk and high value items. No major rail requirement was uncovered when researching this category.

No requirements for processing water were expressed by representatives of the various companies interviewed.

3. FINANCIAL TERMS

Firms in the energy/energy systems category may either own or lease their buildings and land. Local rents for high tech/flex buildings fall in the \$10.00 -\$12.00 range per square foot. Those for multi-tenant buildings are slightly lower--\$8.00 to \$10.00 per square foot. The local market for such buildings is often priced on a modified full service basis in which the landlord pays only part of the building expenses (including outside maintenance) and the tenant pays the rest. Local building expenses typically paid by the tenant for such modified NN rental rates approximate \$2.00 per square foot.

Hanford Study Area Research & Development buildings typically lease for a base rate of about \$8.00 per square foot plus \$5.50 or more for building expenses. R&D laboratory space is usually very expensive because of the tenant improvements required. Tenant improvement costs in the \$120.00 to \$300.00 per square foot range are not unusual

Based on field interviews, it is estimated that fully serviced office space would need to achieve rents of at least \$15.00 per square foot if local land costs were driven exclusively by the marketplace. However, recent industrial land sale prices by local public entities have been below market rates. Such land has sold for as low as \$2,500 per acre because the Port of Benton and the City of Richland acquired the land from the Department of Energy for very little cost. Passing much of these savings through new business users is financially beneficial to them while at the same time causing financial hurdles for private developers.

4. PUBLIC BENEFITS

Development in this category at the levels projected would generate the following economic benefits to the Tri-Cities community:

595 jobs by 2020

An estimated \$137 million in addition gross business receipts annually (constant 1998 dollars)

Fiscal benefits will be quantified as part of the Phase III coordinated development analysis.

5. SUMMARY EVALUATION

This industrial category can be evaluated against the agreed upon feasibility criteria:

Required land area is available and its cost to industry is acceptable.

Required labor is available at acceptable cost.

There are few raw materials required.

Required markets are accessible at reasonable transportation costs.

A desirable quality of life for the labor force is already available.

The business environment is conducive to industry needs.

Required communications infrastructure will soon be available and other utilities are mostly in place.

Public improvements/investments are reasonable given the existence of most of the required infrastructure in north Richland.

Development of this industry will provide public benefits in the form of jobs, economic activity and tax revenues to state and local government.

B. CATEGORY 2: ENVIRONMENTAL

The environmental category includes firms that provide environmental services such as hazardous and solid waste management, R & D, consulting and engineering, remediation and environmental analysis. Companies that manufacture equipment for the analysis of air, gas, soil and water. Specific subcategories have been identified as:

- Pollution control & prevention equipment
- Air monitoring analysis equipment

- Water supply systems
- Waste remediation—solid and liquid
- Refuse and sanitation systems

The Tri-Cities has an established base of such companies including:

- Pacific Northwest National Laboratory (Battelle)
- Science Applications International Corp.
- Enabling Technology Inc.
- Geosafe Corp.
- Scitec Corp.
- Xactex Corp.

1. MARKET ASSESSMENT

A. OUTLOOK

The economic outlook for the U.S. environmental industry is excellent. The national market is estimated at \$134 billion. Although the environmental sector is relatively small, the long-term projections for this industry are very optimistic. Industry growth is forecast at a 3.2 percent annual rate during the next few years.

Hanford's capabilities in this industry category are highly developed in such areas as environmental sciences, robotics, clean-up, nuclear safety, engineering and related R &D, instrumentation and environmental technologies such as geo-technical services. The Hanford community has the opportunity to leverage these existing competencies into the above identified target high-growth niches within private industry. In order to be successful in this area, however, market-driven linkages between Hanford environmental activities and private markets outside the region must be established.

Hanford offers a number of diverse and promising environmental technologies that may have market support in private industry. For example, process and measurement technology to solve environmental and chemical processing problems may be applicable to environmental industries. Other areas include environment safety and health systems, environmental technology assessment and implementation, and ecosystems management to solve complex environmental problems related to hazardous materials and site restoration. Offering skilled personnel in geophysics is still another area.

Existing research entities provide potential environmental businesses in the Hanford Study Area with major technological resources and thereby a probable comparative advantage. For example, the Pacific Northwest National Laboratory (Battelle) in

Richland is a major community asset for leveraging knowledge from government research laboratories into the private sector. PNNL can offer integrated environmental solutions using innovative technologies to clean up environmental hazards or to prevent pollution of the air, soil and water. Many of its technologies are available commercially or can be licensed. Moreover, PNNL can perform contract research for industry using its many capabilities that have previously been available at the national laboratories. Similarly, the Applied Process Engineering Laboratory in Richland is a technology business start-up incubator for lab work and testing. Through it, commercial start-ups can tap the expertise of both the local WSU campus as well as PNNL.

B. EMPLOYMENT PROJECTIONS

The State of Washington Department of Employment Security projects that within the target Environmental industry category, statewide employment growth in environmental R&D will be a fast growth segment. Statewide employment in this segment is forecast to increase by nearly 16,000 jobs during the next 20 years. Strong growth will also occur in the refuse and sanitation systems area as the new jobs across the state increase by an expected 4,150. Overall, employment growth in the environmental target industry category will increase by nearly 21,400 jobs statewide by 2020.

As discussed in the previous section, the Hanford Study Area is well positioned to capture an increased share of this statewide employment growth in the environmental industry. The high concentration of scientific and engineering talent associated with the Hanford contractors, PNNL and the local WSU campus offers a strategic advantage to potential environmental businesses considering a Tri-Cities location.

Our forecast is that the Hanford Study Area could capture over 9 percent of the jobs statewide by 2020 in the environmental industrial category. Much of this local employment would be concentrated in environmental R & D. Specifically, it is forecast that 11 percent of all such work statewide could be captured at the Study Area. It is also projected that employment in both process control/measurement and refuse and sanitation systems industry segments will each capture 5 percent of all such employment in the state.

Total Hanford Study Area employment in the environmental industrial category is forecast to grow by nearly 3,600 employees during the next 20 years. By 2020 it will total almost 5,300 jobs. This forecast job growth will be driven by utilizing the extensive R & D laboratories, testing facilities and scientific talent associated with Hanford. The key to commercialization is leveraging this critical mass of knowledge.

C. COMPETITIVE FACTORS

An assessment of key competitive factors for the environmental systems industry was conducted relative to competitiveness of the Hanford Study Area. This was achieved through a review of the literature and interviews with representatives of businesses in the key industry sectors. The following factors are key to the competitiveness of the area:

1. Scientific talent and expertise in varied areas of environmental research

2. Availability of state-of-the art laboratory and testing resources. This is highly attractive to firms that could consider the Hanford Study Area location.
3. Excellent communications infrastructure (including fiber optics)
4. Quality of the life for the technical and highly-educated environmental workforce

2. PHYSICAL REQUIREMENTS

A. LAND AND FACILITY REQUIREMENTS

Businesses in the environmental industry heavily occupy and R & D and high-tech/flex type buildings once their operations stabilize. Multi-tenant (incubator) buildings are often used by environmental start-up businesses. Environmental research typically takes place in R & D and high tech/flex buildings on sites three acres or less. Building sizes typically range from 15,000 to 40,000 square feet.

Larger buildings are typically used for the manufacture of environmental equipment. Manufacturing sites often require sites of five acres and up .

The total project net new acreage requirement in the Hanford Study Area for the environmental industry is projected to be 208 acres. The predominate building types needed will be R&D, high tech/flex and large manufacturing buildings in the case of environmental machinery production.

B. INFRASTRUCTURE NEEDS

The environmental industrial category will require excellent broadband communications infrastructure. As noted, GTE and other vendors are expected to link running to the Tri-Cities area with fiber optics cable in the very near future. The ability to receive, process, and transmit information through DSL, cable modems or other broadband pipes is rapidly becoming a mandatory infrastructure component necessary for doing business and instantly communicating globally.

Interviews with various environmental companies did not identify a need for rail-serviced manufacturing operations. Most products manufactured in the environmental area will be shipped by truck or air expressed. Good rapid package express services in the Tri-Cities are very important to environmental research companies.

No major requirement was determined for large amounts of processing water by environmental companies.

3. FINANCIAL TERMS

Aside from manufacturing operations, most environmental firms will seek space in high tech or R & D type of buildings. Firms may either own or lease their buildings and land. In certain cases build-to-suit buildings will be required. It is also typical in many environmental firms for sale/leasebacks to occurs to that capital can be concentrated in

the business instead of the real estate. Start-up firms will be attracted to incubator facilities like Applied Process Engineering Laboratory (APEL). The development of rental facilities, particularly incubators, may require public investment.

Tri-Cities building rents for environmental research firms are similar to those for energy research companies. Local rents for high tech/flex buildings are in the \$10.00 - \$12.00 range per square foot. Those for incubator buildings are slightly lower--\$8.00 to \$10.00 per square foot. As noted, the local market for such buildings is often priced on a modified full service basis in which the landlord pays only part of the building expenses (including outside maintenance) and the tenant pays the rest. Local building expenses typically paid by the tenant for such modified NN rental rates approximate \$2.00 per square foot. Hanford Study Area Research & Development buildings typically lease for a base rate of about \$8.00 per square foot plus \$5.50 or more for building expenses. R&D laboratory space is usually very expensive because of the tenant improvements required. Tenant improvement costs in the \$120.00 to \$300.00 per square foot range are not unusual.

A large supply of industrial land is available and costs are low. Much industrial land is available with services either to the lot line or nearby. Moreover, recent industrial land sale prices by local public entities are far below market rates—as low as \$2,500 per acre. A market rate in north Richland for similar land would approximate \$28,000 per acre. Thus, from the point of view of an environmental research business seeking to locate in the Hanford Study Area, industrial land cost is a relatively minor consideration. This issue stands in stark contrast to the high cost and/or availability of industrial land in the central Puget Sound area.

4. PUBLIC BENEFITS

Development in this category at the levels projected would generate the following economic benefits to the Tri-Cities community:

Nearly 3,600 jobs by 2020

An estimated \$385 million in addition gross business receipts annually (constant 1998 dollars)

Fiscal benefits will be quantified as part of the Phase III coordinated development analysis.

5. SUMMARY EVALUATION

This industrial category can be evaluated against the agreed upon feasibility criteria:

Required land area is available and its cost to industry is acceptable. Required rental facilities may not be available without public or private investment.

Required labor is available at acceptable cost.

Required markets are accessible at reasonable transportation costs.

A desirable quality of life for the labor force is already available.

There are few raw materials required.

The business environment is conducive to industry needs.

Required communications infrastructure will soon be available and other utilities are mostly in place.

Public improvements/investments are reasonable given that much of the required infrastructure is already in the ground.

Development of this industry will provide public benefits in the form of jobs, economic activity and tax revenues to state and local government.

C. CATEGORY 3: ADVANCED MATERIALS

The advanced materials category includes non-ferrous metals, plastics-based components, and metal treatment. Specific subcategories have been identified as:

- Specialty plastics
- Aluminum products
- Other non-ferrous metal products (titanium)
- Composites
- Coatings and treatment

The Tri-Cities area has an established base of such companies including:

International Hearth Melting: titanium ingots

Sandvike Specialty Metals: titanium products

Richland Specialty Extrusions (Kaiser): Aluminum products

Western Sintering: metal parts

1. MARKET ASSESSMENT

A. OUTLOOK

The common element of the advanced material business is the increased use of light weight but durable components as substitutes for parts made of iron or steel. Major end users are the automotive and aerospace industries.

The Pacific Northwest has long been a center for aluminum smelting and refining, largely a result of the low cost electricity available in the region. Washington State is the top producer of aluminum in the United States.

Besides low cost power, the primary metals industry in the Pacific Northwest has benefited from the presence of Boeing as a major user of advanced materials. In addition to flat rolled products, Boeing also uses extruded and cast aluminum parts as well as titanium and carbon fiber composite products.

Both Precision Castparts and Kaiser Aluminum have announced plans for parts fabrication facilities to serve Boeing from the Tri-Cities. Neither project has proceeded beyond the planning state at this time.

Use of advanced materials is also growing in the automotive and sporting goods industries. In the former case, advanced materials provide the potential for lowering vehicle weight. In the latter case, materials provide higher performance.

B. EMPLOYMENT PROJECTIONS

The State of Washington Department of Employment Security projects declines in primary metal employment statewide over the next 20 years, as increases in productivity offset growth in production in smelting. The non smelting sectors will grow in employment, however, as advanced materials increase their market penetration. Average annual growth over the next 20 years is projected to be 1.8 percent.

The Tri-Cities area generally, and the Hanford area specifically, are positioned to capture in increased share of this market. These sectors are cost sensitive, to labor costs as well as electricity costs. Much of this activity is already located in eastern Washington for this reason. The major growth opportunities related to the automotive industry are likely to occur at new fabrication facilities near aluminum smelters, or at sites nearer to customers such as Boeing. Accordingly, we project that the Hanford Study Area could capture the largest share of activity in the non-ferrous metal category at 12 percent of State employment, with lower capture rates in the other subsectors. The overall average capture rate is projected to be 3.6 percent, versus a rate less than 1 percent at the present time.

Total employment in the Hanford Study Area in this category is projected to grow from 40 in 1997 to 764 by 2020. Typical businesses employ 20 to 50 people or more in the metals business, and 100 to 150 or more in some of the plastics and composites businesses.

C. COMPETITIVE FACTORS

Based on our review of existing literature, and interviews with representatives of businesses in the key sectors, we identify the following factors to be key to competitiveness of the Hanford Study Area in these sectors.

1. Low cost power continues to be a key factor in the metals product categories.
2. Affordable wage rates and flexible work practices are important to control costs and respond to changing technologies. Wage rates vary from \$8 – \$10 in many of the plastics and composites facilities, to \$16 – \$18 in the more capital intensive metals facilities.
3. A location near a major customer or material is advantageous but not critical. In the case of certain automotive components, raw material suppliers like aluminum smelters, part fabrication facilities, and automotive production facilities may locate in close proximity to each other in the future.

2. PHYSICAL REQUIREMENTS

A. LAND AND FACILITY REQUIREMENTS

The advanced materials businesses typically occupy traditional manufacturing facilities as described in Section 2. The needs of specific users might vary as follows:

	Small	Large
Employees	50	150
Building Square Feet	30,000	90,000
Acres	5	15

The total projected net acreage requirement for the study area is 60 net acres by 2020.

An actual user may require additional acreage to accommodate future expansion.

B. INFRASTRUCTURE NEEDS

Advanced material businesses have electricity requirements which are greater than a typical manufacturing business. International Hearth has a 5.4 megawatt electron beam furnace. Western Sintering has monthly electric usage of 3,000 MWH. Three Phase, 480 volt, 4,000 amp service is required for most businesses in this category. Generally, power needs can be met from the regular electrical service in the area.

There is some process water required for cooling, but that is typically in self contained systems. One commercial resin manufacturer uses approximately 800,000 gallons a day in this way. Additional water is used cleaning tools and domestic purposes. These businesses typically do not discharge untreated wastewater back into community wastewater systems. Any pretreatment is done on-site.

Most businesses are interested in telecommunications links to customers, parent companies, or suppliers.

Most businesses in the sector rely on truck transportation for receipt of materials and shipment of product. Truck traffic includes company owned trucks, common carriers, and chartered carriers; and varies from covered vans, to LTL (less than trailer load) to semitrailer and flatbed trucks. Some companies do receive raw materials or ship by rail, but volumes are less than 15 rail cars per month.

3. FINANCIAL TERMS

The businesses in this category require relatively large manufacturing facilities with specialized equipment and typically own their own facilities. The value of the underlying land is small in comparison with the cost of the building, which is turn is small in comparison with the cost of the equipment in the facility. Using the International Hearth Melting facility as an example, the total cost of the facility can be allocated approximately as follows:

Land:	20 acres @ \$2,000/acre	\$40,000
Building:	90,000 SF @ \$60/SF	5,400,000
Equipment:		<u>32,700,000</u>
Total:		\$38,500,000

Prevailing land prices in the Tri-Cities area are well below the cost of land in other metropolitan areas. From the perspective of the user, local prices represent a savings, but a small one in comparison to total investment. From the perspective of the land owner/seller, the sales price is low, but it still exceeds the sellers basis in the property if, as in the case of the City of Richland and the Port of Benton, they acquired the land for a minimal amount, and if there is little or no cost to provide infrastructure to the perimeter of the property. In the case of existing industrial sites, this is true. In this sense, development of the property for industrial use is financially feasible, and there is no public investment required.

4. PUBLIC BENEFITS

Development in this category at the projected levels would generate the following economic benefits:

724 jobs by 2020

\$216 million in additional gross receipts annually (constant 1998 dollars)

The tax benefits will be quantified as part of the Phase III coordinated development analysis.

5. SUMMARY EVALUATION

This industrial category can be evaluated against the agreed-upon feasibility criteria.

Required land area is available at acceptable cost.

Required labor is available at acceptable cost.

Required raw materials are available.

Required markets are accessible at reasonable transportation cost

Required utilities are available at acceptable cost.

Business environment is conducive to industry needs.

Quality of life is suitable for workforce.

Required public investment is moderate (the largest component being rail). Funding the public investment will be considered in Phase III.

Development will provide public benefit in terms of jobs, gross economic activity, and taxes to State and local governments.

D. CATEGORY 4: INFORMATION AND COMMUNICATIONS

The information and communications subcategory includes a variety of manufacturing and services sectors which provide for the creation, storage, and distribution of information. Specific subcategories have been identified as:

Computer and Communications Equipment

Electronics Components

Communication Services and Systems

Data Systems and Information Retrieval

The Tri-Cities has strong resources in this sector with businesses such as Battelle and Lockheed Martin Services conducting research and providing services for national and international clients.

1. MARKET ASSESSMENT

A. OUTLOOK

Information is the basis for the ongoing growth and restructuring of the national and world economies. Automation and communications have revolutionized most traditional

sectors of the economy. Two of the implications of these changes are profound for areas like the Tri-Cities. First, most economic activity which historically has occurred in urban concentrations can now be decentralized and occur in rural or smaller metropolitan areas. Second, the pace of the change is so great that new technologies and industry participation emerge so frequently that new opportunities are available every day. The outlook for these sectors are very positive, but there is decline in traditional communication activities where automation and new technologies have eliminated many jobs.

LMSI is an excellent local example of growth in information services activity. Charged with diversifying beyond Hanford, LMSI offers help disks, network design and management, website development and software. Their contracts have grown from \$2 million in their first year of the diversification effort, to \$3 million in the second, to \$25 million in the third. Clients include Nike, Footstar, and General Motors.

The Environmental Molecular Sciences Laboratory (EMSL) at the Pacific Northwest Laboratory (PNL) was home to the largest system of IBM computers at the time it was opened two years ago. This computing capacity is available not only to in house projects, but other users in the community. PNL will soon be linked by fiber optic cable to Western Washington. This link will also be available to the entire area.

PNL has developed several technologies which are being commercialized locally, including remote sensing and radio tracking tags. While still in their development stage, they provide promise for equipment and component manufacturing. There are other equipment manufacturers in the area, including Electrical Systems Technologies, manufacturers of wireless modems.

B. EMPLOYMENT PROJECTION

The State of Washington Department of Employment Security projects only nominal growth in communications employment (0.2 percent per year) statewide. But these changes reflect traditional telephone systems. At the same time, wireless systems operators are growing rapidly. Electronic equipment is also projected to grow rapidly, and data processing and information retrieval is projected to grow at rates of 7 to 8 percent annually. Overall, annual growth for the key sectors is projected as 3.5 percent per year through the year 2020.

The Tri-Cities area generally and the Hanford are specifically, are positioned to capture an increased share of this activity. The area's competitive position varies by subcategory, however. The area will have to compete with rural and smaller metropolitan areas throughout its region. Further, software development other than certain specialized applications, have traditionally been attracted to urban areas with a concentrated workforce and amenities. Finally, help centers are particularly competitive in areas like the Tri-Cities. The overall average capture rate for the Hanford Study area is projected to grow to 2.6 percent by the year 2020, versus approximately 1 percent at the present time.

Total employment in the Hanford Study Area is projected to grow from 530 in 1997 to 3,507 by 2020. Typical businesses employ 25 to 100 people for small equipment manufacturers to 500 or more employees for large manufacturing or service providers.

C. COMPETITIVE FACTORS

Based on our review of existing literature, and interviews with representatives of businesses in the key sectors, we identify the following factors to be key to the competitiveness of the Hanford Study Area in these sectors:

1. The availability of broad band communication links like fiber optics is the most important factor, particularly for service providers, but also for equipment manufacturers.
2. Affordable wage rates are important to control costs. Rates of \$8 to \$10 are typical for assembly operations and many help desk services.
3. Many manufacturing facilities continue to be located in the small communities where they were founded. The availability of technology transfer services and incubator support maximizes the probability that an area will provide the seeds of major companies in the future.
4. Software developers, other than those working on specialized applications related to particular industries, will continue to be attracted to urban concentrations where there are a large pool of skilled labor, and a variety of urban amenities.
5. Large volume component production facilities such as memory chips and microprocessors are attracted to areas with labor availability, inexpensive sites, and large quantities of pure water. Markets for such products are projected to show strong growth but have been quite volatile in recent years and the number of potential new facilities is relatively small.

2. PHYSICAL REQUIREMENTS

A. LAND AND FACILITY REQUIREMENTS

The information and communications businesses considered in this category typically require high tech/flex space in the case of equipment and components, or office space in the case of communications systems and data. The needs of specific users might vary as follows:

	High Tech/Flex	Office
Employees	50	500
Building Square Feet	30,000	125,000
Acres	3.5	7.2

The total projected net acreage requirement for the study area is 160 net acres by 2020.

An actual user may require additional acreage to accommodate future expansion.

B. INFRASTRUCTURE NEEDS

As noted above, communications linkages are the most important infrastructure item for this category. Ideally fiber optics will be available through a link to a regional hub, and throughout the local area. The link to the Puget Sound area is expected to be complete by the end of the year. Fiber optics cable is already available in many of the industrial areas in North Richland already.

Other than computer chips and microprocessor components, most of the equipment manufacturing businesses have modest requirements for process water. Further, these requirements for pretreatment of waste water is modest as well.

Businesses in these manufacturing sectors rely exclusively on truck for receipt of materials and shipment of product. Most shipments are by common carrier, often overnight delivery.

3. FINANCIAL TERMS

Businesses in this category may own or lease their facilities. The smaller manufacturing facilities may lease space in an incubator facility until they grow sufficiently to occupy their own building. Rents for such space in the Tri-Cities area range from \$8 to \$12 per square foot per year. Such rates are at the low end of the range in such buildings in the region, and also at the low end of the range necessary to recover the cost of development.

The communication services businesses may also own or lease their buildings, depending on their size and history. Rents for such space in the Tri-Cities is approximately \$15 per square foot per year including expenses. These rates are at the low end of the range in such buildings in the region, and at the low end of the range necessary to recover the cost of development.

Development of rental facilities, particularly incubator facilities may require public investment.

4. PUBLIC BENEFITS

Development in this category at the projected levels would generate the following economic benefits.

3,000 additional jobs by 2020

\$600 million in additional gross receipts annually (constant 1998 dollars)

The tax benefits will be quantified as part of the Phase III coordinated development analysis.

5. SUMMARY EVALUATION

This industry category can be evaluated against the agreed-upon feasibility criteria as follows:

Required land area or facilities can be available for sale or lease at affordable rates.

Required labor is available at acceptable costs.

Required markets are accessible at reasonable transportation cost (or transmission costs).

Required utilities are available at acceptable costs.

Business environment is conducive to industry needs.

Quality of life is suitable for workforce, with possible exception in case of general software development.

Required public investment is minimal, can be funded, and can be recovered through direct revenue.

Development will provide public benefits in terms of jobs, gross economic activity, and taxes to state and local government.

E. CATEGORY 5: WHOLESALE DISTRIBUTION

The wholesale distribution category includes regional and local distribution centers within the surrounding trade area and mail order service activities. Specific subcategories have been identified as:

- Regional Distribution Centers To Retailers
- Local Warehousing Services
- Agricultural Distribution
- Mail Order/Direct Sales

Tri-Cities companies and representing this category include:

- Paramount Supply Company
- Western States Equipment Company
- RDO Equipment

- Applied Industrial Technologies
- Motion Industries

1. MARKET ASSESSMENT

A. OUTLOOK

The wholesale warehousing and distribution industry is vital to economic commerce. Examples of its importance include the following:

Trade—Without wholesale warehouse facilities it would be very difficult to ship goods and commodities produced in the Tri-Cities region and throughout Washington state. Similarly, the wholesale distribution industry is critical for the importation and transport of goods.

Goods Storage/Distribution—Warehouses are utilized by retailers for the goods that they buy and sell; and manufacturers use them to store raw materials and finished goods.

Market Expansion—By locating distribution facilities in various geographical areas, businesses can expand beyond their own local markets.

Enhance Small Firms—One warehouse can serve multiple small firms and thereby give them a better opportunity to grow without large capital investments.

The wholesaling industry is comprised of three categories: (1) merchant wholesalers (2) manufacturer's sales branches, and (3) agents, brokers and commission merchants. Merchant wholesaling firms account for almost 85 percent of all wholesaling businesses. Merchant wholesalers dominate the bulk commodity, capital goods and consumer goods distribution channels.

In recent years, wholesalers have faced increased competition from alternative distribution channels including direct manufacturer-to-retailer arrangements, direct sales from manufacturer to industrial user, mail order and catalogue sales and now the explosion in "internet" commerce. Even in the mid-1990's, these alternative channels accounted for over one-fourth of merchandise distribution. Thus, structural changes in distributive channels are forcing wholesalers to examine and adjust their strategies in order to be competitive. For example, wholesalers are aggressively trying to expand value added services such as relabeling, repackaging, applying bar codes, and next-day delivery. Major efforts are now being made by wholesalers to utilize new computer and communication technologies to improve productivity, reliability and service quality.

Such improvements are difficult since most wholesale trade firms are small, with an average firm size of 11 employees. It is estimated that 90 percent of the 14,100 wholesale trade businesses in the U.S. have fewer than 20 employees. Thus, securing a major regional wholesale distribution center in the Tri-Cities with a large number of employees is a difficult recruitment task.

Although such opportunities are scarce, Wal-Mart's regional distribution center in Hermiston, Oregon (built in 1998) is an example of such a warehouse distribution facility. It cost approximately \$30 million to construct. The facility is on a 200-acre site and is comprised of a 1.1 million building under one roof. It is strategically located near the confluence of two freeways. Ease of access for trucks was a paramount consideration due to the critical need for on-time outbound deliveries to Wal-Mart retail stores in the region. According to the national manager of site selection for Wal-Mart distribution centers, the Hermiston distribution center employs about 800 people at hourly wages somewhat higher than the local norm. Employment in Wal-Mart centers can range from 400 to 1,000 employees.

Overall, the outlook for the wholesale distribution is for slow growth as alternative channels of distribution continue to siphon off sales of particular wholesale trade lines.

B. EMPLOYMENT PROJECTIONS

Wholesale trade employment in Washington state is expected to grow at a slow 0.9 percent average annual rate during the 2000-2020 period. Wholesaling is forecast to grow well below the projected growth rate of total non-agricultural employment statewide during this same period.

In contrast, employment in mail order/direct sales is expected to grow at about a 2.2 percent annual rate. This more rapid growth exemplifies the structural shift taking place in the way goods are distributed in the marketplace. For example, Dakota Direct in Pasco and Sykes Customer Support Center in Milton Freewater, Oregon have recently opened call centers, each currently employ about 300 hourly workers.

The Hanford Study Area is projected to capture only a small share of the statewide growth in wholesale distribution employment during the next 20 years. By 2020, this share of statewide employment is projected at only 0.4 percent. Overall, the Study Area is projected to add only 330 employees. Mail order/direct sales is the industry segment within this category likely to create most of these new jobs.

C. COMPETITIVE FACTORS

An assessment of key competitive factors for the wholesale distribution industry was conducted relative to competitiveness of the Hanford Study Area. This was achieved through a review of the literature and interviews with persons considered knowledgeable in the industry. The following factors were uncovered as key to the competitiveness of the area:

1. The lack of good freeway access immediately adjacent to the Hanford Study Area is a major constraint in attracting wholesale distribution warehousing. Trucks would have to use local (and in some cases neighborhood) arterials
2. Given that much better locations exist in the Tri-Cities area with immediate freeway access and excellent exposure, it is highly unlikely that a major regional wholesale distribution center could be attracted to the Hanford Study Area.

3. The availability of labor in north Richland at modest hourly rates is another concern.
4. The recent State legislation to exempt retail sales tax on construction of warehouse facilities with 200,000 square feet or more, eliminates an economic disadvantage for areas near the Washington-Oregon border.

2. PHYSICAL REQUIREMENTS

A. LAND AND FACILITY REQUIREMENTS

Firms in the wholesale distribution industry typically occupy large warehouse distribution buildings. Major regional distribution facilities in areas such as Hermiston, Oregon when land is relatively inexpensive will incur land-to-building ground coverage ratios in the 10 to 15 percent range. This is not the case in much more expensive outlying locations near large urban areas such as Seattle or Portland where distribution buildings may cover around 38 percent of a site. As noted, large regional distribution centers typically require 120 to 200 acres in smaller community locations. In contrast, small local wholesale operations may only require only an acre or two of land with good truck access.

Mail order/direct sales and technical customer support call centers typically require sites from one to three acres in size. Buildings for such operations would range from 15,000 to 40,000 square feet of finished space.

B. INFRASTRUCTURE NEEDS

The wholesale distribution industrial category requires excellent road access. Ease of egress and ingress for truck transport is of critical importance, as is good freeway access.

Good local communications infrastructure is very important. Obviously, it is the heart of a customer call center operation

No rail requirement was uncovered through interviews when researching this industry category. Even Wal-Mart representative indicated that few of their regional distribution centers have access to rail. What is important to Wal-Mart is the on-time delivery to their stores by “outbound” trucks from regional distribution centers.

Processing water is not a requirement of wholesale distribution or mail order operations. Express package delivery is critical to mail order operations.

3. FINANCIAL TERMS

Firms in the wholesale distribution business may either own or lease their buildings and land. Local Tri-City rents for divisible warehouse distribution space currently run about \$3.50 per square foot for warehouse “shell” space plus \$2.00 per square foot for expenses. Thus, an annual gross rental rate of \$5.50 per square foot is normal in the Tri-Cities.

New fully serviced office space in the Hanford Study Area for a call center operation would command a base rent of about \$10.00 per square foot annually. Yearly building expenses would be an additional \$5.00 to \$5.50 per square foot. Thus, about \$15.00 per square foot would be a typical rental rate for full service office space in the north Richland area.

The above building lease rates could be slightly lower in the Hanford Study Area if recent land acquisitions by local public entities continue to be far below market rates due to dispositions by the Department of Energy for very little cost. As noted, passing much of these savings through new business users is financially beneficial to prospective tenants.

4. PUBLIC BENEFITS

Development in this category at the levels projected would generate the following economic benefits to the Tri-Cities community:

330 jobs by 2020

An estimated \$198 million in additional gross business receipts annually (constant 1998 dollars)

Fiscal benefits will be quantified as part of the Phase III coordinated development analysis.

5. SUMMARY EVALUATION

This industrial category can be evaluated against the agreed upon feasibility criteria:

Required land area is available and its cost to industry is acceptable.

There are no raw materials required.

The business environment is conducive to industry needs.

A desirable quality of life for the labor force is already available.

Required communications infrastructure is available and other standard utilities are available.

Public improvements/investments are reasonable given the existence of most of the required infrastructure in north Richland.

Development of this industry will provide public benefits in the form of jobs, economic activity and tax revenues to state and local government.

F. CATEGORY 6: MISCELLANEOUS MANUFACTURING

The miscellaneous manufacturing category contains a variety of manufacturing sectors, with the common element of being likely to relocate or expand from the Central Puget Sound area or other build-up metropolitan areas in the region. Many manufacturers are considering alternative locations because there is no land available around their existing site, land is too expensive in the major urban areas, labor rates are too high, or the cost of living – particularly the cost of housing is too high for their employees. It is within the State of Washington's interest that these businesses relocate or expand elsewhere in the State rather than outside the State.

The sectors which are the most promising candidates are the ones with the greatest land requirements or are most sensitive to labor costs. The following specific subcategories have been identified.

Mobile Homes/Building Components

Publishing and Printing

Structural Metal Equipment

Conveying Equipment

Gears and Components

Sporting Equipment

1. MARKET ASSESSMENT

A. OUTLOOK

The outlook for each subcategory varies but all are expected to experience growth in aggregate. Even without growth, these categories are candidates for relocation.

Mobile homes and building components are expected to grow as population increases and as manufactured housing becomes increasingly accepted by consumers and lenders. In spite of recent problems with oversupply, the long term outlook is strong. The market for such products remains a regional one, as the cost of transportation (estimated at \$2 per mile) restricts the shipping distance to 200 miles or less.

Publishing is increasingly decentralized as writers and editors move their product electronically. Printing and distribution can occur in rural or small metropolitan areas because of the regular size and value of the product.

Fabricated metal products and industrial equipment of all kinds are projected to grow at rates faster than manufacturing as a whole. With business generally becoming more capital intensive, capital goods manufacturing will grow rapidly. Conveying equipment and components will experience these demand factors. Food processing equipment is a

specific subsection which is becoming more capital intensive, but the growth outlook is somewhat less strong.

Sporting equipment manufacturing will experience strong growth with the increasing interest in fitness, and athletics, and the increasing sophistication of exercise equipment. New sporting equipment from baseball bats to snow boards to treadmills make increasing use of advanced materials and electronic components.

B. EMPLOYMENT PROJECTIONS

Manufacturing employment is projected to grow at rates less than 1 percent per year over the next 10 to 20 years statewide according to the Washington Department of Employment Security. Printing and publishing are projected to grow at a similar rate, as growth in demand is somewhat offset by increases in productivity. Other sectors considered here are projected to grow at 2 percent or more per year through 2010 with a lower rate thereafter. Industrial equipment growth is projected to grow at the highest rate. Overall, employment growth is projected at 1.9 percent per year through 2020.

Rural areas and smaller metropolitan areas will capture an increased share of the activity as the land availability and cost factors affect the profitability of businesses in the urban areas. Department of Employment Security projects that goods producing employment will grow by 10 percent over the next two decades. If that growth can't be accommodated in the central Puget Sound area, other areas of the State will gain the same amount of market share. A portion of this activity will go to other areas of Western Washington, as well as around the Spokane area, and parts of Central Washington. The Tri-Cities area generally and the Hanford area specifically, are positioned to capture a strong share. The Hanford Study Area is projected to capture 4 percent. The remainder of the Tri-Cities area could also capture a portion. Overall, the area's capture could be a very large share of the total. The Hanford Study Area will be most competitive in those sectors involving advanced materials and technologies.

Total employment in the Hanford Study area in this category is projected to grow to 1,040 by 2020. These businesses will generally be small in size with 20 to 100 employees.

C. COMPETITIVE FACTORS

Based on our review of existing literature, and interviews with representatives of businesses in the key sectors, we identify the following factors to be key to competitiveness in the Hanford Study Area in these sectors.

1. Affordable wage rates are important to controlling costs. Rates of \$8 to \$12 per hour for production employees, with higher rates for skilled employees prevail in these sectors.
2. Location near major markets is not critical except in the case of the manufactured home sector. Most goods will travel by truck, so good access to the regional transportation network is important.

3. Close proximity of major suppliers is important, but suppliers tend to cluster around the manufacturers on their own.
4. Quality of life is particularly important in the publishing sector, as their businesses have the flexibility to locate virtually anywhere.

2. PHYSICAL REQUIREMENTS

A. LAND AND FACILITY REQUIREMENTS

The businesses in this category typically occupy manufacturing facilities. The needs of specific uses might vary as follows:

	Small	Large
Employees	20	100
Building Square Feet	12,000	60,000
Acres	2	10

The total projected net acreage requirement within the study area is 80 additional acres.

An actual user may require additional acreage to accommodate future expansion.

B. INFRASTRUCTURE NEEDS

The fabrication operations which are typical of this category do not require unusual amounts of power, process water, waste water streams. They are typically served by local municipal providers. Businesses are increasingly interested in broadband telecommunications linkages to their customers, parent companies, and suppliers.

Virtually all businesses in this category rely on truck transportation for receipt of materials or shipment of product. The trucks are typically common carriers. One exception to this is major building component manufacturers who receive daily rail shipments with lumber and wood products.

3. FINANCIAL TERMS

Businesses in this category may own or lease their facilities. Prevailing rents for manufacturing buildings in the Tri-Cities area are \$3.50 per month plus expenses. Such rents are at the low end of the range found in the Puget Sound, comparable to shell space in the Tacoma/Fife area. However, there is very little existing vacant manufacturing space in the Hanford area.

Businesses needing to purchase facilities will again find few available buildings. For a business seeking to purchase land and develop a building, there are many affordable sites available. Land prices in the City of Richland's Horn Rapids Business Park are as low as \$2,000 per acre as described earlier. Land prices in the Puget Sound area for finished industrial sites are \$125,000 per acre or more.

4. PUBLIC BENEFITS

Development of this category at the projected levels would generate the following economic benefits.

1,040 additional jobs

\$109 million in additional gross receipts annually

The tax benefits will be quantified as part of the Phase III coordinated development analysis.

5. SUMMARY EVALUATION

This category can be evaluated against the agreed-upon feasibility criteria as follows:

Required land area or facilities can be available for sale at affordable rates. Required rental facilities may not be available without public or private investment.

Required labor is available at acceptable costs.

There are few raw materials required.

Required markets are accessible at reasonable transportation cost (or data transmission costs).

Required utilities are available at acceptable costs.

Business environment is conducive to industry needs.

Quality of life is suitable for workforce.

Required public investment is minimal, can be funded, and can be recovered through direct revenue.

Development will provide public benefits in terms of jobs, gross economic activity, and taxes to State and local government.

G. CATEGORY 7: TRANSPORTATION EQUIPMENT MANUFACTURING

The transportation equipment industry category is limited to only the “manufacturing” of transportation equipment. Specific subcategories have been identified as:

- Railroad Equipment
- Truck/Travel Trailers
- Boat Manufacturing
- Space Vehicle Parts & Equipment
- Transportation Equipment N.E.C.-

Local Tri-Cities companies identified that fit this category include:

- Livingston Rebuild Center
- Northwest Jet Boats.

1. MARKET ASSESSMENT

A. OUTLOOK

This market outlook assessment is limited only to firms that would potentially “manufacture” transportation equipment in the Tri-Cities. A comprehensive strategic analysis of the Tri-Cities location relative to “The Business of Transportation” is presented elsewhere in this study. Similarly, Boeing is obviously the dominant transportation equipment manufacturer in the State of Washington. However, it is highly unlikely that Boeing would develop a manufacturing presence in the Tri-Cities and is therefore excluded from this analysis.

The key equipment opportunity that appears to have market support in the Hanford Study Area is locomotive rebuilding and possibly rail car manufacturing. Livingston Rebuild Center (LRC) is already operative on Port of Benton property in the Hanford Study Area. LRC rebuilds, repairs and tests locomotive engines using state of the art equipment and technologies. Engines are rebuilt to OEM specifications. In addition, LRC is working on new technologies to monitor oil and other maintenance requirements of locomotives.

Similarly, interviews with Boise Locomotive representatives showed that locomotive manufacturing can take place at inland locations such as the Tri-Cities. One reason is that despite the high cost of delivering a locomotive to a customer (estimated at \$5 per mile), the approximate million dollar cost of the engine causes the delivery cost to be relatively small in comparison. The other regional competitor is a small locomotive

manufacturer in Tacoma. Thus, expansion of LRC to encompass more locomotive-related manufacturing is a reasonable market possibility. This is particularly true since railroads are increasingly outsourcing locomotive services.

Another good market possibility in the Hanford Study Area is rail car manufacturing. Rail car manufacturing requires much less covered building area than locomotive rebuilding or manufacturing. The Hanford Reservation offers over 100 miles of rail line and over 1,000,000 square feet of available manufacturing and warehouse space served by the rail system.

Another transportation equipment manufacturing possibility in the Hanford Study Area is truck semi-trailer and tanker manufacturing. Such a manufacturing facility would not necessarily need to be near Seattle or Portland, even though the regional customer base is there. Interviews with truck trailer manufacturers revealed that many customers will pick up their trailers at the plant. An example of a remote truck trailer manufacturing operation is Beall Trailers in Billings, Montana.

Finally, the Hanford area may be suitable for some manufacturing and service activities related to a spaceport. The State of Washington is preparing a proposal for a cooperative response to the Venturestar enterprise. Regardless of the outcome of this proposal, there may be further opportunities in this sector.

B. EMPLOYMENT PROJECTIONS

The State of Washington Department of Employment Security projects that the transportation equipment manufacturing industry category will grow slowly during the next 20 years. Less than 3,000 new jobs in this category are expected to be added statewide. By 2020, Washington employment in this category is expected to only total less than 15,300 jobs.

Of these, the Hanford Study Area is expected to capture two percent or slightly over 300 jobs by 2020.

C. COMPETITIVE FACTORS

An assessment of factors for the transportation equipment manufacturing industry was conducted relative to competitiveness of the Hanford Study Area. This was achieved through a review of the literature and interviews with persons considered knowledgeable in the industry. The following factors were uncovered as key to the competitiveness of the area:

1. The local availability of workers willing to work in a heavy manufacturing environment at modest hourly wages is a major consideration. Training programs offered at Columbia Basin Community College (CBCC) provide skilled workers for such industries.

2. A major criteria for locating a manufacturing is inexpensive access to a rail and manufacturing building space
3. Distance to customers is not so far as to be a major market hindrance.

2. PHYSICAL REQUIREMENTS

A. LAND AND FACILITY REQUIREMENTS

Firms in the locomotive manufacturing business typically require the following land and facility requirements:

- Approximately 50 acres of land
- About five miles of rail line
- Multiple manufacturing buildings totaling from 100,000 to 250,000 square feet of space.

In contrast, truck trailer manufacturers typically require about 10 acres of land and 80,000-100,000 square feet of building manufacturing space. A large outside trailer storage area is required. Rail access is not necessary.

B. INFRASTRUCTURE NEEDS

The transportation equipment manufacturing industrial category requires that the electricity costs are relatively cheap. Manufacturing requires large amount of readily accessible power.

Obviously, rail access is critical to locomotive and rail car manufacturing. Rail is not required for truck trailer manufacturing.

No requirements for processing water were expressed by representatives of the various companies interviewed.

3. FINANCIAL TERMS

Annual market lease rates for large manufacturing space in the Tri-Cities currently run about \$3.50 per square foot plus about \$2.00 for building expenses. Given the large inventory of available space on the Hanford site, it is likely that such rental costs could be mitigated substantially.

4. PUBLIC BENEFITS

Development in this category at the levels projected would generate the following economic benefits to the Tri-Cities community:

300 jobs by 2020

An estimated \$54 million in addition gross business receipts annually (constant 1998 dollars)

Fiscal benefits will be quantified as part of the Phase III coordinated development analysis.

5. SUMMARY EVALUATION

This industrial category can be evaluated against the agreed upon feasibility criteria:

Required land area is available and its cost to industry is acceptable.

Required labor is available at acceptable cost.

There are few raw materials required.

Required markets are accessible at reasonable transportation costs.

The business environment is conducive to industry needs.

Required infrastructure is mostly in place.

Public improvements/investments are reasonable given the existence of rail and standard utility requirements

Development of this industry will provide public benefits in the form of jobs, economic activity and tax revenues to state and local government.

H. CATEGORY 8: LOW COMPATIBILITY USES

Low compatibility uses include a broad array of uses which are perceived to be incompatible with many traditional uses. These uses share a requirement for large sites to provide adequate visual and spatial buffers from surrounding uses. Five specific subcategories have been identified:

Sand and Gravel

Fertilizers/Pesticides

Explosives

Arms and Ammunition

Land Fill

While mere storage of solid waste in a land fill elicited objections from some members of the Stakeholders Committee, the idea of resource recovery was considered an acceptable use. Resource recovery is considered under Category 1 Energy and Energy Services.

1. MARKET ASSESSMENT

A. OUTLOOK

Sand and gravel are key supplies to the construction industry. Requirements for sand and gravel will grow with population growth, and non-residential construction. Future growth is expected to be strong, if not matching the levels of recent years. Sand and gravel is generally marketed to local areas, as the transportation cost is high. However, large deposits can be shipped to larger regional markets if lower cost transportation via rail or barge is possible. Hanford offers potentially the largest source of sand and gravel in the State of Washington. ACME Construction has held discussions with the Port of Benton regarding lease of mineral rights at Hanford. ACME is seeking new sites as its current site in South Richland will be exhausted in the next 5 years.

Fertilizers and pesticides are a segment of the chemicals sector which is already well represented in the Tri-Cities. This segment is expected to grow, but at rates below past years.

The explosives industry primarily serves the construction industry and will experience the same growth in demand as that sector. However, this industry is heavily regulated. Only four manufacturers remain in the United States. The Bureau of Alcohol Tobacco and Firearms requires that manufacturers be located at least 2,500 lineal feet from adjacent roads and developed areas.

Similarly, ammunition manufacturers are required to maintain extensive buffers from surrounding development. Again, there are only four manufacturers in the United States. The commercial ammunition market is relatively small in comparison to Department of

Defense requirements. Government ammunition is produced by Government Owned Contractor Operated (GOCO) facilities.

Weapons manufacturing is typical of many metal fabrication processes, except for testing of the product on firing ranges. Firing ranges in newer facilities are located underground. There are small firearms manufacturers throughout the United States. The product is marketed throughout the world.

B. EMPLOYMENT PROJECTIONS

The State Department of Employment Security projects construction employment to grow at 1 percent or less per year over the next 20 years. Industry requirements like sand and gravel and explosives will likely grow at comparable rates. Other segments in this category may also grow at only modest rates because of pressures to restrict use of firearms and pesticides. The overall average rate of growth for this category is projected to be 0.9 percent per year through 2020.

The Hanford Study Area has the potential to capture a large share of this activity because of the limited number of locations which are suitable for some of these categories. The sand and gravel capture rate will be much smaller, reflecting the local nature of this business. Overall the capture rate is projected to be 7.6 percent of Statewide employment in these categories by 2020.

Total employment in the Hanford Study Area is projected to be 100 jobs by 2020.

C. COMPETITIVE FACTORS

1. Availability of large sites will be the major factor in attracting these types of businesses.
2. The cooperation of local government will be an important factor in accommodating these businesses.
3. Access to rail will be a benefit to the sand and gravel operation and some low compatibility manufacturers.

2. PHYSICAL REQUIREMENTS

A. LAND AND FACILITY REQUIREMENTS

As described above, large sites are the major requirement of these businesses. The needs of specific users may vary as follows:

	Sand & Gravel	Explosives	Arms
Employers	70	100	50
Building Square Feet	-	150,000	75,000
Acres	200	300	25

The total projected net acreage requirement is 510 net acres by 2020.

B. UTILITIES

The sand and gravel uses require power for crushing and water for rinsing. It is assumed that the water requirement could be met by on-site wells. The manufacturing facilities have typical requirements for manufacturers with average requirements for power, process water, and waste water treatment. Water and waste water needs could be met by on-site wells and septic systems.

Rail access would be desirable if not essential for the sand and gravel and large manufacturers.

3. FINANCIAL TERMS

With the exception of sand and gravel, businesses in this category generally own their sites and facilities because of their unique land and facility requirements. The cost of development within the site boundaries would be the responsibility of the user. Because of the relatively low utilization of the property, a user could not pay typical industrial property rates. The rate would likely be in the range of \$100 to \$1,000 per acre. A long term lease would likely be acceptable if the term were long enough and if there were provisions to protect lenders.

The sand and gravel use would likely pay a royalty based on the volume of material extracted over time.

4. PUBLIC BENEFITS

Development in this category at the projected level would generate the following level of economic benefits.

150 additional jobs by 2020.

\$15 million in additional gross receipts annually (constant 1998 dollars).

These tax benefits will be quantified as part of the Phase III coordinated development analysis.

5. SUMMARY EVALUATION

This industry category can be evaluated against the agreed-upon criteria as follows:

Required land area and underlying resources are available, and at affordable royalty rates or lease rates.

Required labor is available at acceptable costs.

There are few raw materials required (except in the case of sand and gravel).

Required utilities would be available in the form of on-site wells and septic systems.

Business environment is conducive to industry needs.

Required markets are accessible at a reasonable transportation cost, and rail is available for key businesses.

Quality of life is suitable for workforce.

Required public investment is minimal except in the case of a rail spur.

Development will provide public benefits in terms of jobs, gross economic activity, and taxes to State and local government.

APPENDIX III ATTACHMENTS

1. Employment Projections
 - A. Industry Categories by 4-Digit SIC
 - B. Projected State Employment by Subcategory
 - C. Projected Study Area Employment Subcategory
 - D. Projected State Growth Rates by Subcategory
 - E. Projected Study Area Shares by Subcategory
2. Land and Building Requirements
 - A. Photos of Building Types
 - B. Net Acreage Requirements by Building Type and Industry Category
3. Public Investment Requirements
 - A. Cost Estimating Matrix

ATTACHMENT 1A

HANFORD INVESTMENT STUDY EMPLOYMENT PROJECTION ASSUMPTIONS 4 Digit SIC Codes by Category

Category 1 Energy/Energy Systems

Energy R&D/Testing	3825, 8734
Laboratory Instruments	3826
Electric & Other Energy Sources	4910, 4931, 4932

Category 2 Environmental

Process Control/Measurement	3822, 3823, 3824, 3829
Environmental R & D	8711, 8731
Refuse & Sanitation	4950

Category 3 Advanced Materials

Specialty Plastics	2822, 3082, 3083
Aluminum Products	3353, 3354, 3355, 3363
Non-Ferrous Metals	3313, 3356, 3369, 3399
Composites	2821, 2824, 3087
Coatings/Treatment	3398, 3471

Category 4 Information/Communications

Computer & Communication Eq.	3571, 3572, 3575, 3577, 3661, 3663, 3669
Electronic Components	3671, 3672, 3674, 3675, 3676, 3677, 3678, 3679
Communication Services/Systems	4812, 4813, 4820, 4830, 4840, 4890
Data Systems/Info Retrieval	7373, 7374, 7375, 7376, 7379

Category 5 Wholesale/Distribution

Mail Order/Direct Sales	5961, 5963
Regional Distribution	5023, 5044, 5045, 5064, 5072, 5111, 5137, 5149, 5151
Local Wholesale	4225
Agricultural Distribution	5083, 5153, 5159, 5191
Machinery & Equipment Distr.	5049, 5051, 5063, 5084, 5085, 5087
Chemicals and Allied Products	5160, 5162

Category 6 Miscellaneous Manufacturing

Mobile Homes/Building Compon.	2451, 2452
Publishing and Printing	2720, 2731, 2732, 2740
Structural Metal Equipment	3441, 3443, 3448, 3449
Conveying Equipment	3534, 3535, 3536, 3537
Gears and Components	3566, 3568, 3569
Sporting Equipment	3949

Category 7 Transportation Equipment Mfg.

3740, 3715, 3716, 3792, 3732, 3769, 3799

Category 8 Low Compatibility Uses

Mining	1442
Pesticides/fertilizers	2873, 2874, 2875, 2879
Explosives/Arms/Ordinance	3482, 3483, 3484

ATTACHMENT 1B

PROJECTED EMPLOYMENT BY INDUSTRIAL CATEGORY

		1997	2005	2010	2015	2020
Category 1 Energy/Energy Systems	Energy R&D/Testing	5,288	6,699	7,396	8,086	8,754
	Laboratory Instruments	438	474	498	521	543
	Electric & Other Energy Sources	12,713	13,766	14,114	14,470	14,762
	Subtotal	18,439	20,939	22,008	23,078	24,058
Category 2 Environmental	Process Control/Measurement	5,884	6,372	6,697	7,003	7,288
	Environmental R & D	24,124	30,560	33,740	36,888	39,935
	Refuse & Sanitation	6,332	8,021	8,856	9,682	10,482
	Subtotal	36,340	44,952	49,293	53,574	57,705
Category 3 Advanced Materials	Specialty Plastics	9,271	10,862	11,876	12,857	13,851
	Aluminum Products	2,800	3,281	3,587	3,883	4,183
	Non-Ferrous Metals	1,391	1,630	1,782	1,929	2,078
	Composites	190	223	243	263	284
	Coatings/Treatment	1,306	1,530	1,673	1,811	1,951
	Subtotal	14,958	17,526	19,161	20,744	22,347
Category 4 Information/ Communications	Computer & Communication Eq.	10,178	15,038	17,433	19,917	22,424
	Electronic Components	8,637	12,761	14,793	16,901	19,029
	Communication Services/Systems	29,903	44,180	51,217	58,515	65,882
	Data Systems/Info Retrieval	12,345	18,239	21,144	24,157	27,198
	Subtotal	61,063	90,218	104,587	119,490	134,534
Category 5 Wholesale/Distribution	Mail Order/Direct Sales	8,046	10,192	11,253	12,303	13,319
	Regional Distribution	25,144	27,227	28,616	29,927	31,144
	Local Wholesale	1,653	1,790	1,881	1,967	2,047
	Agricultural Distribution	7,358	7,842	8,161	8,451	8,707
	Machinery & Equipment Distr.	16,438	17,800	18,708	19,565	20,360
	Chemicals and Allied Products	2,678	2,854	2,970	4,166	5,575
	Subtotal	61,317	67,706	71,590	76,380	81,153
Category 6 Miscellaneous Manufacturing	Mobile Homes/Building Compon.	1,267	1,484	1,623	1,757	1,893
	Publishing and Printing	3,392	3,673	3,860	4,037	4,201
	Structural Metal Equipment	2,854	3,615	3,992	4,364	4,725
	Conveying Equipment	4,343	5,502	6,074	6,641	7,189
	Gears and Components	1,353	1,714	1,892	2,069	2,240
	Sporting Equipment	3,465	4,389	4,846	5,298	5,736
	Subtotal	16,674	20,378	22,288	24,167	25,984
Category 7 Transportation Equipment Subtotal		12,333	13,355	14,036	14,679	15,276
Category 8 Low Compatibility Uses	Mining	856	927	974	1,019	1,060
	Pesticides/fertilizers	622	674	708	740	770
	Explosives/Arms/Ordinance	85	92	97	101	105
	Subtotal	1,563	1,693	1,779	1,860	1,936
TOTAL		222,687	276,767	304,742	333,971	362,993
EMPLOYMENT CHANGE:						
Interval			54,080	27,975	29,229	29,022
Cumulative from 1997			54,080	82,055	111,284	140,306

ATTACHMENT 1C

PROJECTED EMPLOYMENT BY INDUSTRIAL CATEGORY

		1997	2005	2010	2015	2020
Category 1	Energy R&D/Testing	68	134	222	323	438
Energy/Energy Systems	Laboratory Instruments	14	19	25	29	33
	Electric & Other Energy Sources	1,299	1,404	1,440	1,476	1,506
	Subtotal	1,381	1,557	1,686	1,828	1,976
Category 2	Process Control/Measurement	14	127	201	280	364
Environmental	Environmental R & D	1,696	2,445	3,037	3,689	4,393
	Refuse & Sanitation	-	160	266	387	524
	Subtotal	1,710	2,733	3,503	4,356	5,281
Category 3	Specialty Plastics	-	54	119	193	277
Advanced Materials	Aluminum Products	18	33	54	78	125
	Non-Ferrous Metals	22	65	107	154	249
	Composites	-	4	7	11	14
	Coatings/Treatment	-	31	50	72	98
	Subtotal	40	187	337	508	764
Category 4	Computer & Communication Eq.	-	75	174	299	448
Information/	Electronic Components	-	64	148	254	381
Communications	Communication Services/Systems	-	221	512	878	1,318
	Data Systems/Info Retrieval	530	912	1,057	1,208	1,360
	Subtotal	530	1,272	1,892	2,638	3,507
Category 5	Mail Order/Direct Sales	-	102	113	123	133
Wholesale/Distribution	Regional Distribution	-	-	-	-	-
	Local Wholesale	-	-	-	-	-
	Agricultural Distribution	-	-	-	-	-
	Machinery & Equipment Distr.	6	178	187	196	204
	Chemicals and Allied Products	-	-	-	-	-
	Subtotal	6	280	300	319	337
Category 6	Mobile Homes/Building Compon.	-	15	32	53	76
Miscellaneous Manufacturing	Publishing and Printing	-	37	77	121	168
	Structural Metal Equipment	-	36	80	131	189
	Conveying Equipment	-	55	121	199	288
	Gears and Components	-	17	38	62	90
	Sporting Equipment	-	44	97	159	229
	Subtotal	-	204	446	725	1,039
Category 7	Transportation Equipment Subtotal	-	134	211	294	306
Category 8	Mining	-	56	58	61	64
Low Compatibility Uses	Pesticides/fertilizers	-	13	21	30	31
	Arms/Ordinance	-	23	34	46	53
	Subtotal	-	92	114	136	147
TOTAL		3,667	6,458	8,488	10,804	13,356
EMPLOYMENT CHANGE:						
	Interval		2,791	2,029	2,316	2,553
	Cumulative from 1997		2,791	4,821	7,137	9,689

ATTACHMENT 1D

EMPLOYMENT PROJECTION ASSUMPTIONS STATE EMPLOYMENT GROWTH RATES

		1997-2005	2005-2010	2010-2015	2015-2020
Category 1	Energy R&D/Testing	3.0%	2.0%	1.8%	1.6%
Energy/Energy Systems	Laboratory Instruments	1.0%	1.0%	0.9%	0.8%
	Electric & Other Energy Sources	1.0%	0.5%	0.5%	0.4%
Category 2	Process Control/Measurement	1.0%	1.0%	0.9%	0.8%
Environmental	Environmental R & D	3.0%	2.0%	1.8%	1.6%
	Refuse & Sanitation	3.0%	2.0%	1.8%	1.6%
Category 3	Specialty Plastics	2.0%	1.8%	1.6%	1.5%
Advanced Materials	Aluminum Products	2.0%	1.8%	1.6%	1.5%
	Non-Ferrous Metals	2.0%	1.8%	1.6%	1.5%
	Composites	2.0%	1.8%	1.6%	1.5%
	Coatings/Treatment	2.0%	1.8%	1.6%	1.5%
Category 4	Computer & Communication Eq.	5.0%	3.0%	2.7%	2.4%
Information/	Electronic Components	5.0%	3.0%	2.7%	2.4%
Communication	Communication Services/Systems	5.0%	3.0%	2.7%	2.4%
	Data Systems/Info Retrieval	5.0%	3.0%	2.7%	2.4%
Category 5	Mail Order/Direct Sales	3.0%	2.0%	1.8%	1.6%
Wholesale/Distribution	Regional Distribution	1.0%	1.0%	0.9%	0.8%
	Local Wholesale	1.0%	1.0%	0.9%	0.8%
	Agricultural Distribution	0.8%	0.8%	0.7%	0.6%
	Machinery & Equipment Distr.	1.0%	1.0%	0.9%	0.8%
	Chemicals and Allied Products	0.8%	0.8%	7.0%	6.0%
Category 6	Mobile Homes/Building Compon.	2.0%	1.8%	1.6%	1.5%
Miscellaneous Manufacturing	Publishing and Printing	1.0%	1.0%	0.9%	0.8%
	Structural Metal Equipment	3.0%	2.0%	1.8%	1.6%
	Conveying Equipment	3.0%	2.0%	1.8%	1.6%
	Gears and Components	3.0%	2.0%	1.8%	1.6%
	Sporting Equipment	3.0%	2.0%	1.8%	1.6%
Category 7					
Transportation Equipment Mfg.		1.0%	1.0%	0.9%	0.8%
Category 8	Mining	1.0%	1.0%	0.9%	0.8%
Low Compatibility Uses	Pesticides/fertilizers	1.0%	1.0%	0.9%	0.8%
	Explosives/Arms/Ordinance	1.0%	1.0%	0.9%	0.8%

ATTACHMENT 1E

**EMPLOYMENT PROJECTION ASSUMPTIONS
HANFORD CAPTURE RATES**

		1997	1997	2005	2010	2015	2020
		Tri-Cities	Hanford	Hanford	Hanford	Hanford	Hanford
Category 1 Energy/ Energy Systems	Energy R&D/Testing	1.5%	1.3%	2.0%	3.0%	4.0%	5.0%
	Laboratory Instruments	0.0%	3.2%	4.0%	5.0%	5.5%	6.0%
	Electric & Other Energy Sources	33.0%	10.2%	10.2%	10.2%	10.2%	10.2%
	Subtotal	23.2%	7.5%				
Category 2 Environmental	Process Control/Measurement	3.6%	0.2%	2.0%	3.0%	4.0%	5.0%
	Environmental R & D	14.1%	7.0%	8.0%	9.0%	10.0%	11.0%
	Refuse & Sanitation	1.7%	0.0%	2.0%	3.0%	4.0%	5.0%
	Subtotal	10.2%	4.7%				
Category 3 Advanced Materials	Specialty Plastics	0.2%	0.0%	0.5%	1.0%	1.5%	2.0%
	Aluminum Products	0.6%	0.6%	1.0%	1.5%	2.0%	3.0%
	Non-Ferrous Metals	23.1%	1.6%	4.0%	6.0%	8.0%	12.0%
	Composites	11.6%	0.0%	2.0%	3.0%	4.0%	5.0%
	Coatings/Treatment	0.0%	0.0%	2.0%	3.0%	4.0%	5.0%
	Subtotal	2.6%	0.3%				
Category 4 Information/ Communications	Computer & Communication Eq.	0.4%	0.0%	0.5%	1.0%	1.5%	2.0%
	Electronic Components	0.6%	0.0%	0.5%	1.0%	1.5%	2.0%
	Communication Services/Systems	1.3%	0.0%	0.5%	1.0%	1.5%	2.0%
	Data Systems/Info Retrieval	0.2%	4.3%	5.0%	5.0%	5.0%	5.0%
	Subtotal	0.8%	0.9%				
Category 5 Wholesale/ Distribution	Mail Order/Direct Sales	1.2%	0.0%	1.0%	1.0%	1.0%	1.0%
	Regional Distribution	2.2%	0.0%				
	Local Wholesale	0.5%	0.0%				
	Agricultural Distribution	4.6%	0.0%				
	Machinery & Equipment Distr.	1.4%	0.0%	1.0%	1.0%	1.0%	1.0%
	Chemicals and Allied Products	2.4%	0.0%				
	Subtotal	2.1%	0.0%				
Category 6 Miscellaneous Manufacturing	Mobile Homes/Building Compon.	0.0%	0.0%	1.0%	2.0%	3.0%	4.0%
	Publishing and Printing	8.1%	0.0%	1.0%	2.0%	3.0%	4.0%
	Structural Metal Equipment	2.2%	0.0%	1.0%	2.0%	3.0%	4.0%
	Conveying Equipment	6.4%	0.0%	1.0%	2.0%	3.0%	4.0%
	Gears and Components	4.7%	0.0%	1.0%	2.0%	3.0%	4.0%
	Sporting Equipment	2.9%	0.0%	1.0%	2.0%	3.0%	4.0%
	Subtotal	4.7%					
Category 7 Transportation Mfg. Subtotal		0.3%	0.0%	1.0%	1.5%	2.0%	2.0%
Category 8 Low Compatibility Uses	Mining	14.8%	0.0%	6.0%	6.0%	6.0%	6.0%
	Pesticides/fertilizers	56.6%	0.0%	2.0%	3.0%	4.0%	4.0%
	Explosives/Arms/Ordinance	0.0%	0.0%	25.0%	35.0%	45.0%	50.0%
	Subtotal	30.6%	0.0%				
TOTAL		5.1%	1.6%				

ATTACHMENT 2A
PHOTOS OF BUILDING TYPES

High Tech/Flex Building

R & D Building

Large Manufacturing

Office Building

Warehouse Distribution Building

Multi-Tenant Building

High Tech/Flex Building

R & D Building

Large Manufacturing

Office Building

Warehouse Distribution Building

Multi-Tenant Building

ATTACHEMNT 2B

REQUIRED NET ACREAGE BY FACILITY TYPE

1997

	<u>Energy</u>	<u>Environmental</u>	<u>Materials</u>	<u>Information</u>	<u>Distribution</u>	<u>Misc. Mfg.</u>	<u>Transportation</u>	<u>Low Compatib.</u>	<u>Total</u>
Divisible Warehouse/Distribution	0	0	0	0	2	0	0	0	2
Large Manufacturing	25	31	3	10	0	0	0	0	69
Multi-Tenant Building	10	13	0	2	0	0	0	0	25
High-Tech/Flex	19	24	0	11	0	0	0	0	54
Research & Development	24	29	0	3	0	0	0	0	56
Office	2	2	0	2	0	0	0	0	7
Low Compatibility	0	0	0	0	0	0	0	0	0
Subtotal	80	100	3	28	2	0	0	0	213

2005

	<u>Energy</u>	<u>Environmental</u>	<u>Materials</u>	<u>Information</u>	<u>Distribution</u>	<u>Misc. Mfg.</u>	<u>Transportation</u>	<u>Low Compatib.</u>	<u>Total</u>
Divisible Warehouse/Distribution	0	0	0	0	73	0	0	0	73
Large Manufacturing	29	50	13	23	0	13	10	0	138
Multi-Tenant Building	12	20	0	5	0	1	0	0	38
High-Tech/Flex	21	38	1	26	0	1	0	0	88
Research & Development	27	47	1	7	0	1	0	0	83
Office	2	4	0	5	0	0	0	0	12
Low Compatibility	0	0	0	0	0	0	0	317	317
Subtotal	91	159	15	67	73	15	11	317	749

ATTACHMENT 2B (continued)

REQUIRED NET ACREAGE BY FACILITY TYPE

2010

	Energy	Environmental	Materials	Information	Distribution	Misc. Mfg.	Transportation	Low Compatib.	Total
Divisible Warehouse/Distribution	0	0	0	0	78	0	0	0	78
Large Manufacturing	31	64	23	35	0	29	15	0	197
Multi-Tenant Building	13	26	1	7	0	2	1	0	49
High-Tech/Flex	23	48	2	39	0	2	1	0	115
Research & Development	29	60	1	11	0	1	1	0	103
Office	2	5	0	8	0	1	0	0	17
Low Compatibility	0	0	0	0	0	0	0	391	391
Subtotal	98	204	27	100	79	34	18	391	951

2015

	Energy	Environmental	Materials	Information	Distribution	Misc. Mfg.	Transportation	Low Compatib.	Total
Divisible Warehouse/Distribution	0	0	0	0	83	0	0	0	83
Large Manufacturing	34	80	35	48	0	47	22	0	265
Multi-Tenant Building	14	33	1	10	0	3	1	0	61
High-Tech/Flex	25	60	3	55	0	2	1	0	147
Research & Development	31	75	1	15	0	2	1	0	126
Office	3	6	0	11	0	1	0	0	22
Low Compatibility	0	0	0	0	0	0	0	469	469
Subtotal	106	254	41	139	84	55	25	469	1173

ATTACHMENT 2B (continued)

REQUIRED NET ACREAGE BY FACILITY TYPE

2020

	Energy	Environmental	Materials	Information	Distribution	Misc. Mfg.	Transportation	Low Compatib.	Total
Divisible Warehouse/Distribution	0	0	0	0	88	0	0	0	88
Large Manufacturing	36	97	53	64	0	67	22	0	340
Multi-Tenant Building	15	39	1	13	0	4	1	0	74
High-Tech/Flex	27	73	5	72	0	4	1	0	182
Research & Development	34	91	2	20	0	3	1	0	151
Office	3	8	1	15	0	1	0	0	28
Low Compatibility	0	0	0	0	0	0	0	506	506
	115	308	62	185	88	79	26	506	1369

REQUIRED NET ACREAGE BY FACILITY TYPE

Summary

	1997	2005	2010	2015	2020	Change 1997 to 2020
Divisible Warehouse/Distribution	0	70	80	80	90	90
Large Manufacturing	70	140	200	270	340	270
Multi-Tenant Building	30	40	50	60	70	40
High-Tech/Flex	50	90	120	150	180	130
Research & Development	60	80	100	130	150	90
Office	10	10	20	20	30	20
Low Compatibility	0	320	390	470	510	510
Total	220	750	960	1180	1370	1150

ATTACHMENT 3A Cost Estimating Matrix

Hanford Investment Study - Phase 2 Cost Estimates for Public Investment

	Common Factors														
	Site Size (acres)	Building Size (sq. ft.)	Tenants (#)	Employees (#)	Parking Area (sq. ft.)	Service Connection Distance (linear ft.)	On-Site Developer Costs								Minimal Public Cost Per Site
							Site Grading (dollars)	*Electrical Service (dollars)	Water Service (dollars)	Sanitary Sewer (dollars)	Storm Sewer (dollars)	Storm Water Quality (dollars)	Fiber Optic Cable (dollars)	Total Developer Cost Per Site (dollars)	(dollars)
Divisible Warehouse Distribution	150	653,400	1	600	220,500	220	300,000	62,000	11,000	16,000	6,000	300,000	8,000	703,000	70,300
Large Manufacturing	35	228,690	1	385	128,700	220	70,000	107,000	11,000	16,000	6,000	70,000	8,000	288,000	28,800
Multi-Tenant Buildings	4	34,848	2	60	25,425	220	8,000	91,000	11,000	16,000	6,000	8,000	8,000	148,000	14,800
High-Tech Flex Use	4	34,848	2	60	27,450	180	8,000	110,000	9,000	13,000	5,000	8,000	7,000	160,000	16,000
Research & Development	4	34,848	2	108	35,325	180	8,000	110,000	9,000	13,000	5,000	8,000	7,000	160,000	16,000
Office	4	69,696	2	216	78,300	180	8,000	110,000	9,000	13,000	5,000	12,000	7,000	164,000	16,400

- Notes: 1) All costs are in 1999 dollars.
2) As before, costs are 'base' construction costs and do not include the following:
5% Construction Contingencies
10% Mobilization
12% Construction Engineering (Management)
10% Plans, Specs & Estimates
5% Design Administration (Management)
3) Assumed fiber optic service to be a necessity for all business types.
4) Assumed an aggregate of 878 developable acres exists within the three southerly areas.
5) Each of the six business concepts was addressed by itself.
6) Costs developed are specific to each of the six business concepts and assume no other development.
7) The 'North Area' is generally assumed to be a one mile square section of land, just north of Horn Rapids Road and just west of Route 4.
8) Additional road and utility costs, for both the North Area and the Horn Rapids Rail Center, are based on fully developing a large, one mile square tract into 4 sites of 150 acres, 16 sites of 35 acres, or 128 sites of 4 acres.
9) Based on note 8, the "additional road and utility" costs are therefore distributed evenly between either 4, 16, or 128 business sites.
This assumption significantly influences the total costs per site.
10) *City of Richland, Energy Services Department, may provide a subsidy of up to \$45,000 per hookup.
1) **Minimal public costs per site are assumed to be ten percent of total on-site developer costs for each business concept. Does not include ra

ATTACHMENT 3A Cost Estimating Matrix (continued)

Hanford Investment Study - Phase 2 Cost Estimates for Public Investment

	Technology & Business Campus	Richland Industrial Center	Horn Rapids Rail Center			North Area		
	Total Public Cost Per Site (dollars)	Total Public Cost Per Site (dollars)	Rail (dollars)	Additional Roads & Utilities (dollars)	Total Public Cost Per Site (dollars)	Rail (dollars)	Additional Roads & Utilities (dollars)	Total Public Cost Per Site (dollars)
Divisible Warehouse Distribution	70,300	70,300		319,000	389,300		446,000	516,300
Large Manufacturing	28,800	28,800		240,000	268,800		271,000	299,800
Multi-Tenant Buildings	14,800	14,800	-	77,000	91,800	-	81,000	95,800
High-Tech Flex Use	16,000	16,000	-	77,000	93,000	-	81,000	97,000
Research & Development	16,000	16,000	-	77,000	93,000	-	81,000	97,000
Office	16,400	16,400	-	77,000	93,400	-	81,000	97,400